

# 5 Agile Distributed Wi-Fi Access Points

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## 5.1 AD9430DN Product Description

### 5.1.1 Product Characteristics (AD9430DN-12 and AD9430DN-24)

The AD9430DN is a central AP used in Huawei agile distributed Wi-Fi solution. It supports PoE power supply and can be connected to multiple remote units (RUs) deployed indoors. The central AP and RUs are connected through network cables, which greatly extends the coverage range, enhances flexibility in AP deployment and planning, and reduces the engineering construction costs. The central AP manages the RUs and processes services in a centralized manner. The RUs process radio signals independently. Such distributed architecture further improves the wireless access capability, creating optimal service experience for users.

The central AP is recommended for environments with complex wall structures and high-density rooms, such as schools, hotels, hospitals, and office meeting rooms. Signals are transmitted through network cables without attenuation. The RUs are deployed indoors and provide comprehensive signal coverage.

The AD9430DN is available in two models: AD9430DN-24 and AD9430DN-12. You can choose a model based on your network requirements.

- AD9430DN-24: provides 24 downlink GE interfaces and supports PoE power supply.
- AD9430DN-12: provides 12 downlink GE interfaces and supports PoE power supply.

The central AP does not provide radio modules, and therefore must be deployed together with RUs to implement various functions such as STA access.

The central AP can work in Fit, Fat, or cloud mode.

- Fit AP: The central APs are uniformly managed by the AC. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.
- Fat AP: The central AP manages RUs independently. A Fat AP can be used as the central AP when the network has low throughput requirements.
- Cloud AP: The central AP works with the SDN controller to implement functions such as user access, AP online, authentication, routing, AP management, security, and QoS. The central AP and RUs can go online without configurations and are centrally managed by the Cloud Manager.

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#### NOTICE

The AD9430DN is a class A product. In daily lives, the product may cause radio interference in which case the user may be required to take adequate measures.

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## Long-Distance Network Coverage

Unlike the traditional distributed AP which allows for a maximum feeder length of 15 m, the central AP uses network cables to replace feeder cables and supports up to 100 m distance from the RUs. The network coverage range is therefore expanded by several times.

## Flexible Deployment

The deployment of central APs is free from restrictions of feeder length. It can be easily mounted to a ceiling or wall in the equipment room or on the corridor.

## No Wall Penetration Loss, No Coverage Hole

Restricted by feeder length or installation requirements, signals have to pass through walls in some scenarios, resulting in large signal attenuation. If rooms to be covered have complex structures, coverage holes may occur. To prevent these problems, lots of calculation and verification work needs to be carried out. Huawei distributed solution solves these problems. In this solution, RUs are placed in rooms, and signals are transmitted over wired cables, without wall penetration loss, delivering high-quality wireless access services.

## Concurrent Traffic Forwarding on Uplink Gigabit Interfaces

The AD9430DN-24 provides four uplink combo interfaces that can be connected to optical fibers or network cables. The AD9430DN-12 provides two uplink GE interfaces. The central AP can forward service traffic on the uplink interfaces simultaneously. The high forwarding capability ensures that concurrent services of RUs are processed at high speeds.

## PoE Capability on Downlink Interfaces, Direct Connection to RUs

Downlink interfaces of the central AP support PoE power supply. Therefore, you do not need to configure a power supply for each RU separately. The AD9430DN-24 and AD9430DN-12 can be directly connected to 24 RUs and 12 RUs, respectively. They can connect to more RUs through PoE switches to cover more rooms.

## Link Disconnection Survival

The central AP in Fit mode supports link disconnection survival. When the link between the central AP and AC disconnects, the central AP and RUs can maintain the current working states, preventing service interruptions of users and ensuring high-reliability transmission.

## Low Engineering Cost

Compared with traditional distributed APs, the central AP cuts down the following expenses:

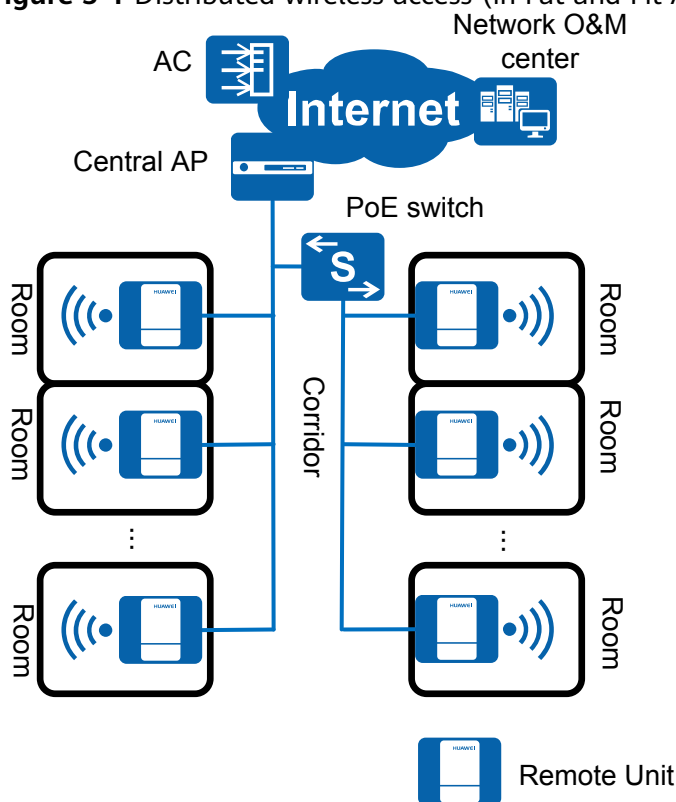
- Construction: Network cables replace expensive feeder cables. The central AP can directly use the network cables originally routed in the rooms, without the need of deploying new cables.
- License: The maximum number of central APs in Fit mode allowed by the AC is controlled by licenses, but RUs do not require licenses. Therefore, one central AP can use RUs to cover dozens of rooms.

## Hierarchical Processing Technology, High Wireless Forwarding Capability

Huawei distributed solution uses innovative hierarchical processing technology. The central AP manages RUs in a centralized manner and concurrently forwards service traffic, while the RUs only process radio signals. The hierarchical design makes the network structure clearer and reduces the processing burden on the central AP and RUs, improving efficiency and optimizing the overall wireless forwarding performance.

## 5.1.2 Usage Scenario (AD9430DN-12 and AD9430DN-24)

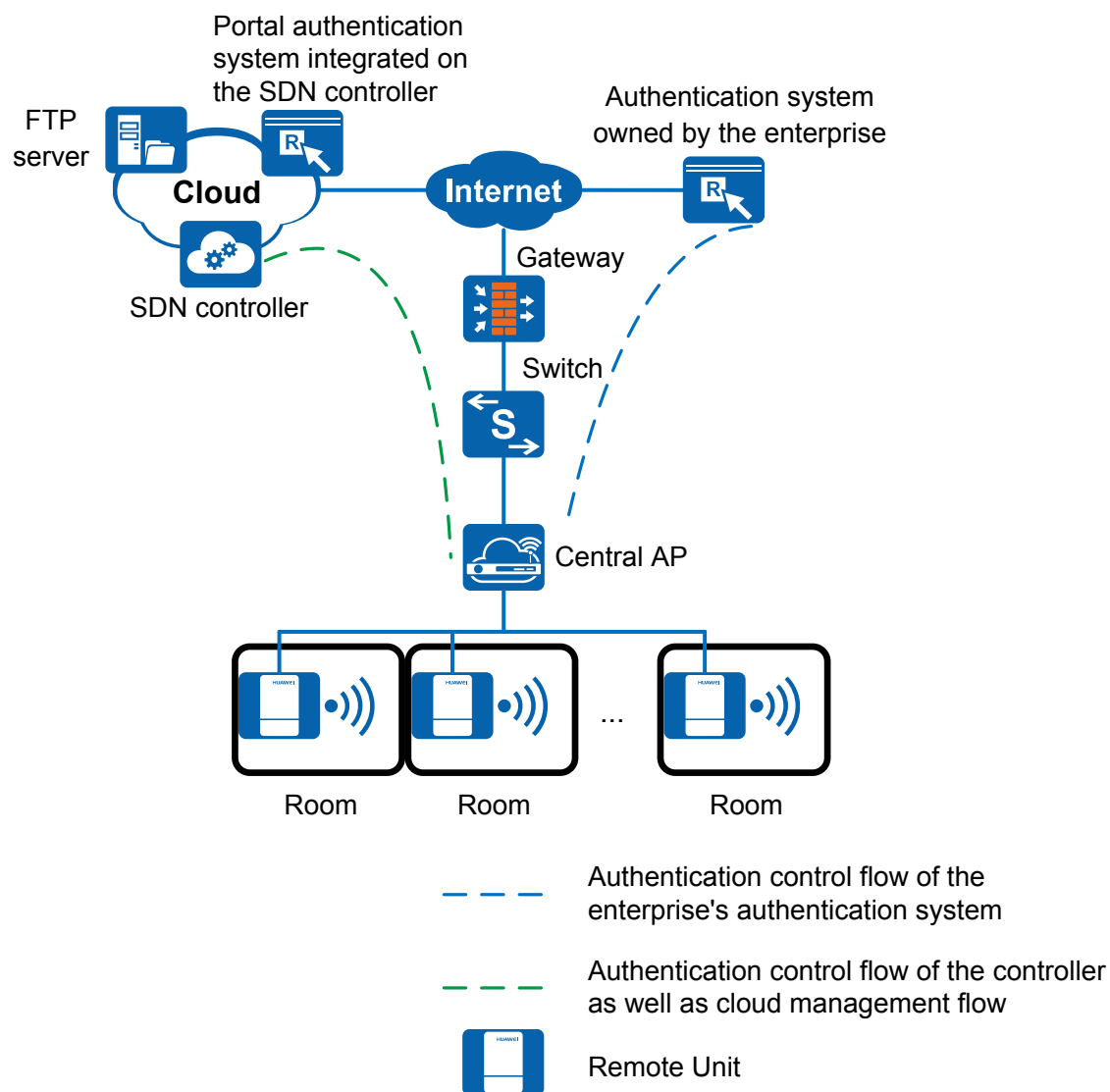
Figure 5-1 Distributed wireless access (in Fat and Fit AP modes)



As shown in the figure, the downlink GE interfaces of the central AP support PoE power supply and can be directly connected to RUs. The central AP can connect to more RUs through a PoE switch. The central AP communicates with the RUs through network cables and can be placed in the equipment room or on the corridor.

When the central AP works in Fat AP mode, no AC needs to be deployed on the network. The services are directly configured on the central AP, and the central AP manages its connected RUs.

**Figure 5-2** Distributed wireless access (in cloud-based management mode)



In this networking, the device functions as a cloud AP and works with the SDN controller on the same cloud for user access, AP going-online, authentication, routing, AP management, security, and QoS. An enterprise can choose to use the Portal authentication server integrated in the SDN controller or the authentication server deployed by itself.

### 5.1.3 Hardware Information (AD9430DN-12)

#### Appearance

**NOTE**

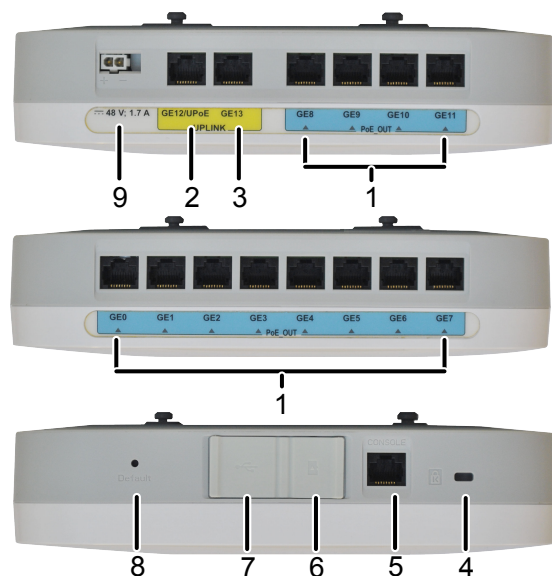
The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

Figure 5-3 Appearance of the AD9430DN-12



## Ports

Figure 5-4 Ports on the AD9430DN-12



As shown in **Figure 5-4**, each interface can be described as follows:

1. GE0-GE11: downlink network ports connecting to the RUs or lower-layer switch. These ports support 10M/100M/1000M auto-sensing and PoE output.
2. GE12/UPoE: uplink network port that supports 10M/100M/1000M auto-sensing and UPoE input.
3. GE13: uplink network port connecting to the AC switch or upper-layer. This interface supports 10M/100M/1000M auto-sensing.
4. Lock port: connects to the security lock to fix the device to an immovable object around.

5. Console port: RJ45 port used to connect to a maintenance terminal for AP configuration and management.
6. Micro SD card slot: connects to a Micro SD card to extend the storage space of the AP. The SD 2.0 standard is supported.
7. USB port: connects to a USB flash drive or other storage devices to extend the storage space of the AP. The USB2.0 standard is supported.
8. Default button: restores factory settings and restarts the device if you hold down the button more than 3 seconds.
9. DC input power socket: connects to the power supply through a DC power cable.

## LED Indicator

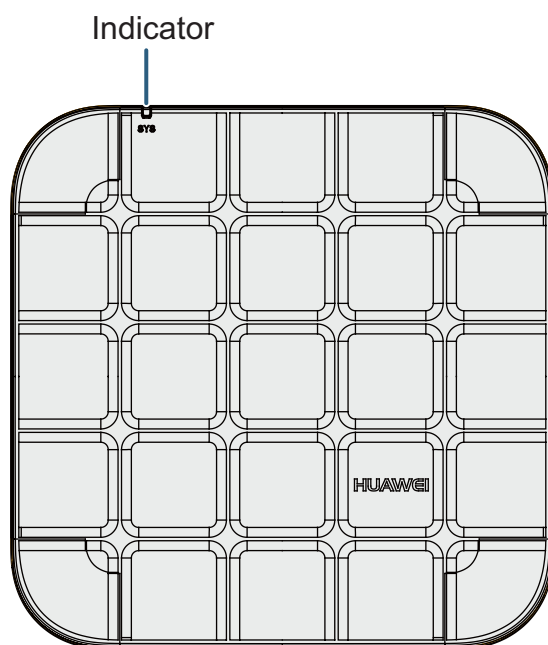
The AD9430DN-12 provides the following indicators:

- System indicator: reflects running status of the device.
- Downlink interface indicators: reflect data transmission and PoE output status of downlink network interfaces.
- USB indicator: reflects data transmission status of the USB flash drive.

### NOTE

- Indicator colors may vary slightly at different temperature.
- The USB indicator is located inside the panel. The indicator turns on after the AP is powered on and connected to a USB flash drive.

**Figure 5-5** System indicator



**Table 5-1** Description of the system indicator

| Type                          | Color | Status                           | Description  |
|-------------------------------|-------|----------------------------------|--|
| Default status after power-on | Green | Steady on                        | The AP is just powered on and the software is not started yet.   |
| Software startup status       | Green | Steady on after blinking once    | After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green.  |
| Running status                | Green | Blinking once every 2s (0.5 Hz)  | <ul style="list-style-type: none"> <li>The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.</li> <li>The system enters the Uboot CLI.</li> </ul>  |
|                               |       | Blinking once every 5s (0.2 Hz)  | The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.   |
| Alarm                         | Green | Blinking once every 0.25s (4 Hz) | <ul style="list-style-type: none"> <li>The software is being upgraded.</li> <li>After the software is loaded and started, the AP requests to go online if it works in Fit AP or cloud-based management mode. The indicator remains in this state before the AP successfully goes online.</li> <li>The AP works in Fit AP or cloud-based management mode and fails to go online.</li> </ul> |



| Type  | Color | Status    | Description  |
|-------|-------|-----------|--|
| Fault | Red   | Steady on | A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually. |

Figure 5-6 Downlink interface indicators

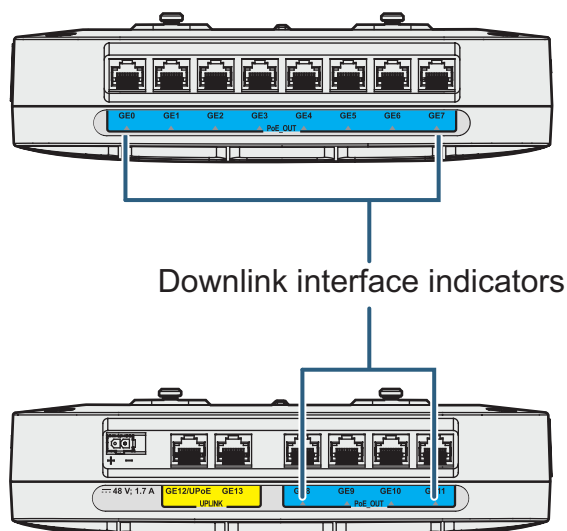
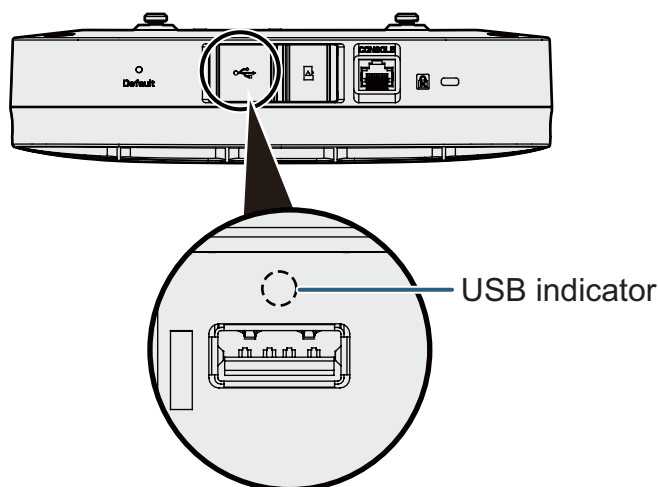


Table 5-2 Description of downlink interface indicators

| Color  | Status    | Description   |
|--------|-----------|---|
| Green  | Steady on | The network interface is connected, and no data is being transmitted.   |
| Green  | Blinking  | The network interface is connected, and data is being transmitted.  |
| Yellow | Steady on | The network interface is not connected and the PoE out function is disabled.  |
| Yellow | Blinking  | The network interface is not connected and the PoE out function fails.<br>The device stops providing PoE power due to errors such as installing an incompatible PD. |
| -      | Off       | The network interface is not connected and the PoE out function is enabled.   |

Figure 5-7 USB indicator (reserved)



## Basic Specifications

Table 5-3 Basic specifications

| Item                       |                                    | Specification  |
|----------------------------|------------------------------------|--|
| Physical specifications    | Dimensions (H x W x D)             | 53 mm x 220 mm x 220 mm  |
|                            | Weight                             | 0.8 kg   |
|                            | System memory                      | <ul style="list-style-type: none"> <li>1 GB DDR3</li> <li>4 MB NOR Flash</li> <li>512 MB NAND Flash</li> </ul>   |
| Power specifications       | Power input                        | <ul style="list-style-type: none"> <li>DC (rated voltage: 48 V; input voltage range: 46 V to 57 V)</li> <li>UPoE (complies with Huawei standards)</li> </ul> <p><b>NOTE</b><br/>To ensure that the device works normally, use the power adapter delivered with the device.</p>   |
|                            | Maximum power consumption          | 16.2 W (excluding PoE and USB output power)  |
| Environment specifications | Operating temperature and altitude | <ul style="list-style-type: none"> <li>-60 m to +1800 m: -10°C to +50°C</li> <li>1,800 m to 5,000 m: The highest operating temperature reduces by 1°C every time the altitude increases by 300 m.</li> </ul> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>Operating temperature of the UPoE power adapter: -20°C to 60°C</li> <li>Operating temperature of the DC power adapter: 0°C to 40°C</li> </ul> |

| Item |                      | Specification              |
|------|----------------------|----------------------------|
|      | Storage temperature  | -40°C to +70°C             |
|      | Operating humidity   | 5% to 95% (non-condensing) |
|      | Atmospheric pressure | 70 kPa to 106 kPa          |

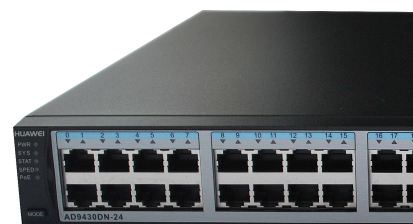
## 5.1.4 Hardware Information (AD9430DN-24)

### Appearance

 **NOTE**

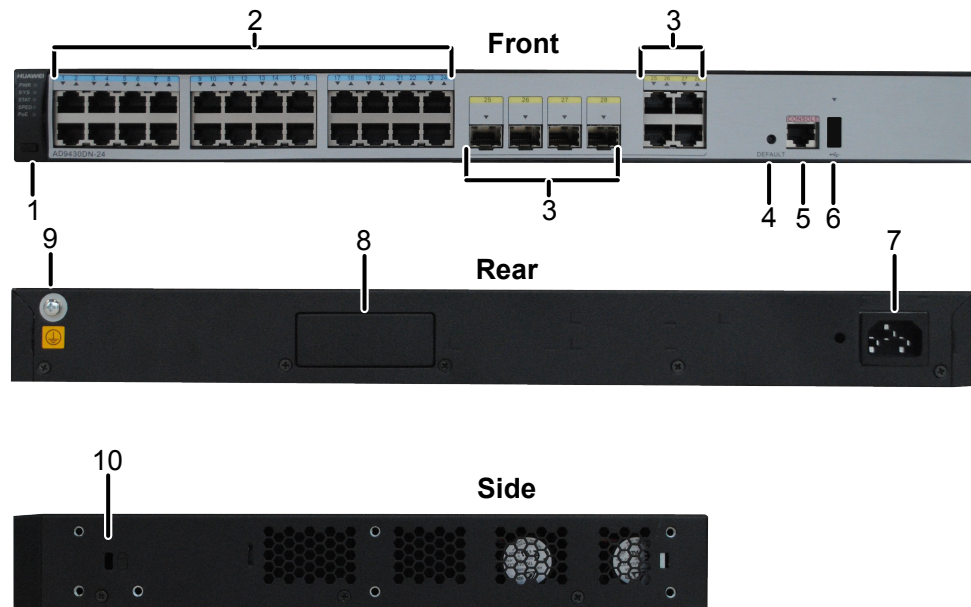
The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

**Figure 5-8** Appearance of the AD9430DN-24



## Ports

Figure 5-9 Ports on the AD9430DN-24



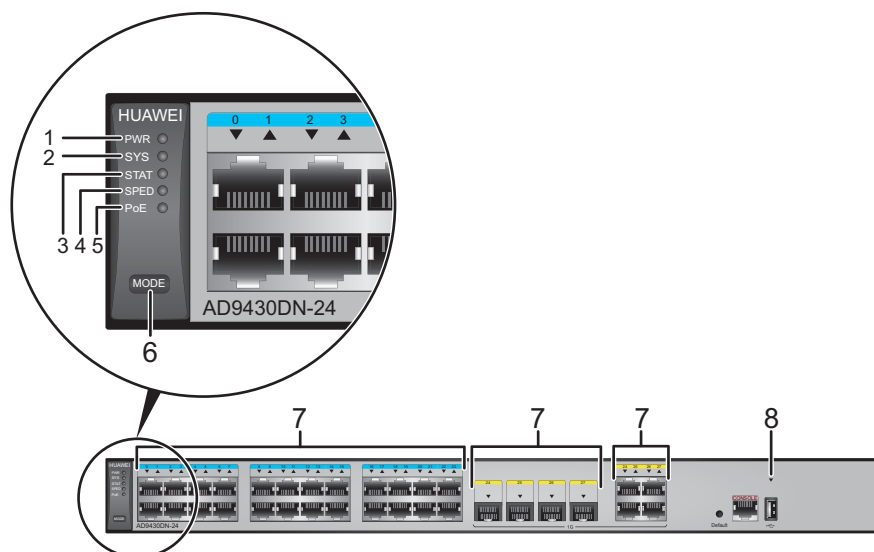
As shown in [Figure 5-9](#), each port can be described as follows:

1. MODE button: switches the working mode of the indicator.
2. GEO-GE23: downlink network ports connecting to the RUs or lower-layer switch. These ports support 10M/100M/1000M auto-sensing and PoE output.
3. Combo port: uplink network port connecting to an AC or upper-layer switch. A combo port consists of an optical port and an electrical port, which cannot work at the same time. The electrical ports support 10M/100M/1000M auto-sensing, and the optical ports support 100M/1000M optical modules.
4. Default button: restores factory settings and restarts the device if you hold down the button more than 3 seconds.
5. Console port: connects to a maintenance terminal for device configuration and management.
6. USB port: connects to a USB flash drive to transfer configuration and upgrade files.
7. Power input port for AC power supply.
8. Filler panel: reserved for network expansion.
9. Ground point: connects to the ground cable.
10. Lock port: protects the device against theft.

## LED Indicator

[Figure 5-10](#) shows the indicators on the AD9430DN-24 front panel.

**Figure 5-10** Indicators on the AD9430DN-24 front panel



**Table 5-4** describes indicators on the AD9430DN-24 front panel.

**NOTE**

Indicator colors may vary slightly at different temperature.

**Table 5-4** Description of indicators on the AD9430DN-24 front panel

| No. | Indicator/<br>Button         | Color | Description   |
|-----|------------------------------|-------|---|
| 1   | Power supply indicator: PWR  | Green | <ul style="list-style-type: none"> <li>Off: The device is powered off.</li> <li>Steady on: The power module is working properly.</li> </ul>   |
| 2   | System status indicator: SYS | -     | Off: The system is not running.   |
|     |                              | Green | <ul style="list-style-type: none"> <li>Fast blinking (4 Hz): The system is starting.</li> <li>Slow blinking (0.5 Hz): The system is running properly.</li> </ul>  |
|     |                              | Green | <ul style="list-style-type: none"> <li>Fast blinking (4 Hz): The system is registering or has failed to register in the cloud-managed mode.</li> <li>Slow blinking (0.5 Hz): The system has successfully registered in the cloud-managed mode.</li> </ul> |
|     |                              | Red   | Steady on: After registering, the system does not operate properly, or a fan or temperature alarm has been generated.   |

| No. | Indicator/<br>Button           | Color | Description  |
|-----|--------------------------------|-------|--|
| 3   | Status mode indicator:<br>STAT | Green | <ul style="list-style-type: none"> <li>Steady on: The service port indicators work in status mode and show the link connection states and link activity on ports.</li> <li>Off: The status mode is not selected.</li> </ul>  |
| 4   | Speed mode indicator:<br>SPED  | Green | <ul style="list-style-type: none"> <li>Steady on: The service port indicators show the port speed. After 45 seconds, the service port indicators automatically restore to the status mode.</li> <li>Off: The speed mode is not selected.</li> </ul>  |
| 5   | PoE mode indicator: PoE        | Green | <ul style="list-style-type: none"> <li>Steady on: The service port indicators show the PoE status. After 45 seconds, the service port indicators automatically restore to the status mode.</li> <li>Off: The PoE mode is not selected.</li> </ul>  |
| 6   | Mode switching button: MODE    | -     | <ul style="list-style-type: none"> <li>When you press this button once, the SPED indicator turns green and the service port indicators change to the speed mode.</li> <li>When you press this button a second time, the PoE indicator turns green and the service port indicators change to the PoE mode.</li> <li>When you press this button a third time, the STAT indicator turns green and the service port indicators restore to the default mode.</li> </ul> <p><b>NOTE</b><br/>If you do not press the MODE button within 45 seconds, the service port indicators restore to the default mode. In this case, the STAT indicator is steady green, and the SPED and PoE indicators are off.</p> |

| No. | Indicator/<br>Button   | Color    | Description   |
|-----|--|----------|---|
| 7   | Service port indicator <ul style="list-style-type: none"> <li>• Electrical ports: The ports are numbered from bottom to top and left to right, starting with 0.</li> <li>• Optical ports: Each optical port has a corresponding indicator above it.</li> </ul> |          | Meanings of service port indicators vary in different modes. For details, see <a href="#">Table 5-5</a> . |
| 8   | USB indicator  | Reserved |   |

**Table 5-5** Description of service interface indicators in different modes

| Display Mode | Color | Description  |
|--------------|-------|--|
| Status       | Green | <ul style="list-style-type: none"> <li>• Off: The port is not connected or has been shut down.</li> <li>• Steady on: The port is connected.</li> <li>• Blinking: The port is sending or receiving data.</li> </ul>                 |
| Speed        | Green | <ul style="list-style-type: none"> <li>• Off: The port is not connected or has been shut down.</li> <li>• Steady on: The port is operating at 10/100 Mbit/s.</li> <li>• Blinking: The port is operating at 1000 Mbit/s.</li> </ul> |



| Display Mode | Color | Description   |
|--------------|-------|---|
| PoE          | Green | <ul style="list-style-type: none"> <li>Off: The port does not provide PoE power.</li> <li>Steady on: The port is providing PoE power.</li> <li>Blinking: The power of the PD exceeds the power supply capability of the port or exceeds the threshold. Or the PD does not comply with PoE.</li> </ul> |

## Basic Specifications

Table 5-6 Basic Specifications

| Item                       | Description               |  |
|----------------------------|---------------------------|--|
| Technical specifications   | Dimensions (H x W x D)    | 43.6 mm x 442 mm x 312 mm  |
|                            | Weight                    | 4.4 kg   |
|                            | System memory             | <ul style="list-style-type: none"> <li>1 GB DDR3</li> <li>16 MB NOR Flash</li> <li>2 GB SD card</li> </ul>   |
| Power specifications       | Power input               | <ul style="list-style-type: none"> <li>Rated voltage: 100 V AC to 240 V AC, 50/60 Hz</li> <li>Maximum voltage range: 90 V AC to 264 V AC, 47 Hz to 63 Hz</li> </ul>                  |
|                            | Maximum power consumption | 435 W (device power consumption: 55 W, PoE: 380 W)   |
| Environment specifications | Operating temperature     | <ul style="list-style-type: none"> <li>-60 m to +1800 m: 0°C to +45°C</li> <li>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases by 300 m.</li> </ul> |
|                            | Storage temperature       | -40°C to +70°C   |
|                            | Operating humidity        | 5% to 95% (non-condensing)   |
|                            | IP rating                 | IP20   |
|                            | Atmospheric pressure      | 70 kPa to 106 kPa  |

## 5.1.5 Hardware Information (AD9430DN-12 and AD9430DN-24)

For AP performance specifications, log in to [Huawei official website](#) and download the brochure of the corresponding AP model, or query the specifications using [Info-Finder](#).

## 5.2 AD9431DN-24X Product Description

### 5.2.1 Product Characteristics (AD9431DN-24X)

The AD9431DN-24X is a central AP used in Huawei agile distributed Wi-Fi solution. It supports PoE power supply and can be connected to multiple remote units (RUs) deployed indoors. The central AP and RUs are connected through network cables, which greatly extends the coverage range, enhances flexibility in AP deployment and planning, and reduces the engineering construction costs. The central AP manages the RUs and processes services in a centralized manner. The RUs process radio signals independently. Such distributed architecture further improves the wireless access capability, creating optimal service experience for users.

The central AP is recommended for environments with complex wall structures and high-density rooms, such as schools, hotels, hospitals, and office meeting rooms. Signals are transmitted through network cables without attenuation. The RUs are deployed indoors and provide comprehensive signal coverage.

The AD9431DN-24X provides 24 downlink GE interfaces and supports PoE power supply.

The central AP does not provide radio modules, and therefore must be deployed together with RUs to implement various functions such as STA access.

The central AP can work in Fit, Fat, or cloud mode.

- Fit AP: The central APs are uniformly managed by the AC. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.
- Fat AP: The central AP manages RUs independently. A Fat AP can be used as the central AP when the network has low throughput requirements.
- Cloud AP: The central AP works with the SDN controller to implement functions such as user access, AP online, authentication, routing, AP management, security, and QoS. The central AP and RUs can go online without configurations and are centrally managed by the Cloud Manager.

#### NOTICE

The AD9431DN-24X is a class A product. In daily lives, the product may cause radio interference in which case the user may be required to take adequate measures.

## Long-Distance Network Coverage

Unlike the traditional distributed AP which allows for a maximum feeder length of 15 m, the central AP uses network cables to replace feeder cables and supports up to 100 m distance from the RUs. The network coverage range is therefore expanded by several times.

## Flexible Deployment

The deployment of central APs is free from restrictions of feeder length. It can be easily mounted to a ceiling or wall in the equipment room or on the corridor.

## No Wall Penetration Loss, No Coverage Hole

Restricted by feeder length or installation requirements, signals have to pass through walls in some scenarios, resulting in large signal attenuation. If rooms to be covered have complex structures, coverage holes may occur. To prevent these problems, lots of calculation and verification work needs to be carried out. Huawei distributed solution solves these problems. In this solution, RUs are placed in rooms, and signals are transmitted over wired cables, without wall penetration loss, delivering high-quality wireless access services.

## Concurrent Traffic Forwarding on Uplink 10GE Interfaces

The AD9431DN-24X provides four uplink 10GE interfaces that can be connected to optical fibers. The central AP can forward service traffic on the uplink interfaces simultaneously. The high forwarding capability ensures that concurrent services of RUs are processed at high speeds.

## PoE Capability on Downlink Interfaces, Direct Connection to RUs

Downlink interfaces of the central AP support PoE power supply. Therefore, you do not need to configure a power supply for each RU separately. The AD9431DN-24X can be directly connected to 24 RUs. They can connect to more RUs through PoE switches to cover more rooms.

## Link Disconnection Survival

The central AP in Fit mode supports link disconnection survival. When the link between the central AP and AC disconnects, the central AP and RUs can maintain the current working states, preventing service interruptions of users and ensuring high-reliability transmission.

## Low Engineering Cost

Compared with traditional distributed APs, the central AP cuts down the following expenses:

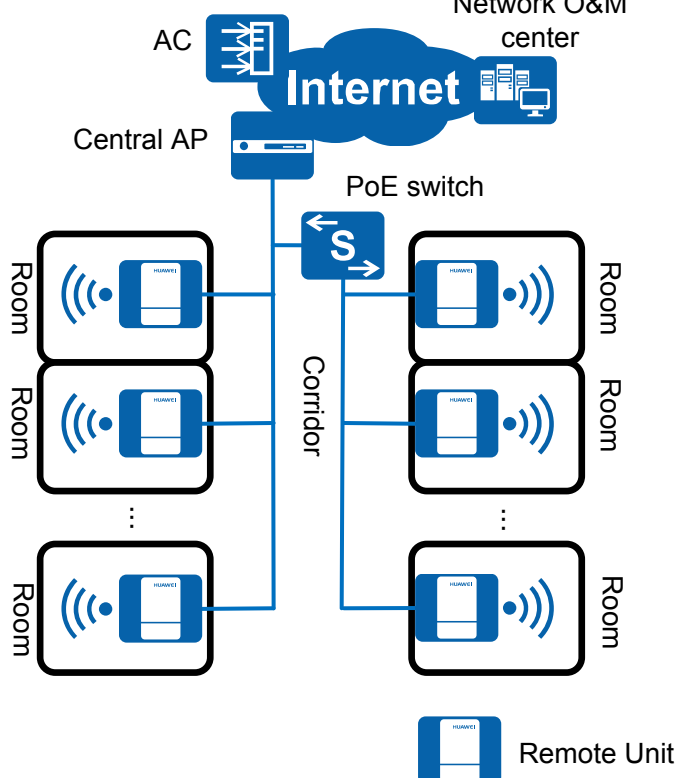
- Construction: Network cables replace expensive feeder cables. The central AP can directly use the network cables originally routed in the rooms, without the need of deploying new cables.
- License: The maximum number of central APs in Fit AP mode allowed by the AC is controlled by licenses, but RUs do not require licenses. Therefore, one central AP can use RUs to cover dozens of rooms.

## Hierarchical Processing Technology, High Wireless Forwarding Capability

Huawei distributed solution uses innovative hierarchical processing technology. The central AP manages RUs in a centralized manner and concurrently forwards service traffic, while the RUs only process radio signals. The hierarchical design makes the network structure clearer and reduces the processing burden on the central AP and RUs, improving efficiency and optimizing the overall wireless forwarding performance.

### 5.2.2 Usage Scenario (AD9431DN-24X)

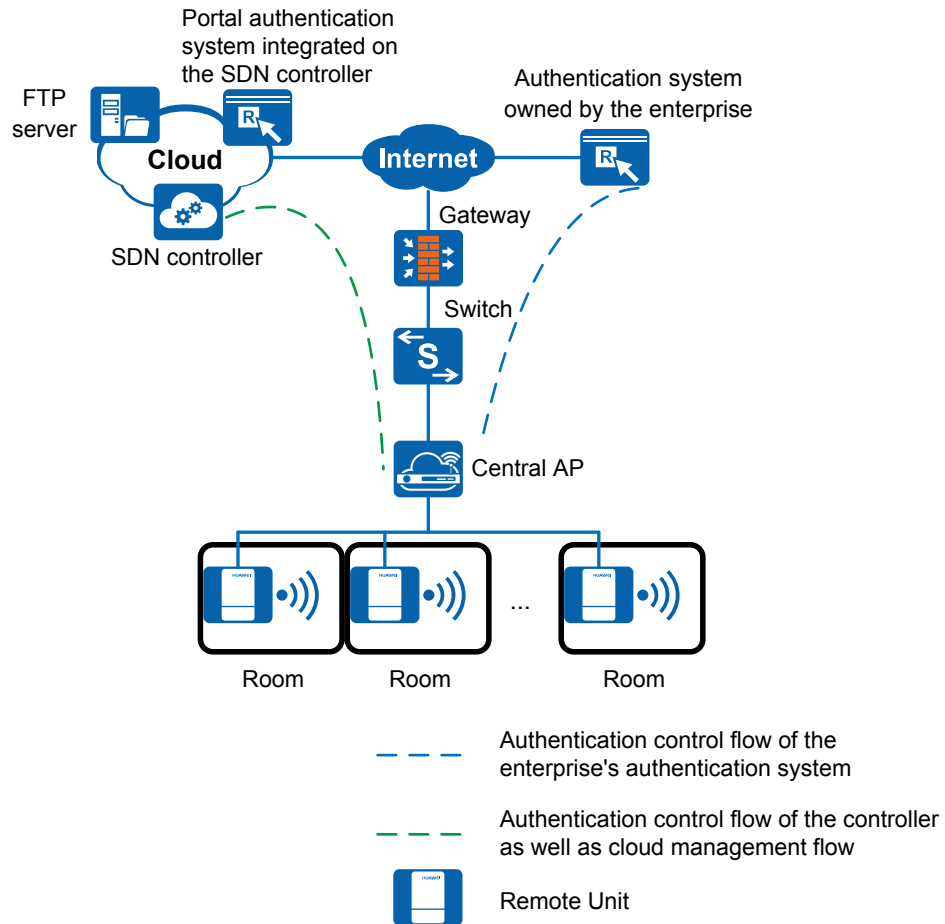
Figure 5-11 Distributed wireless access (in Fat and Fit AP modes)  
Network O&M



As shown in the figure, the downlink GE interfaces of the central AP support PoE power supply and can be directly connected to RUs. The central AP can connect to more RUs through a PoE switch. The central AP communicates with the RUs through network cables and can be placed in the equipment room or on the corridor.

When the central AP works in Fat mode, no AC needs to be deployed on the network. The services are directly configured on the central AP, and the central AP manages its connected RUs.

**Figure 5-12** Distributed wireless access (in cloud-based management mode)



In this networking, the device functions as a cloud AP and works with the SDN controller on the same cloud for user access, AP going-online, authentication, routing, AP management, security, and QoS. An enterprise can choose to use the Portal authentication server integrated in the SDN controller or the authentication server deployed by itself.

## 5.2.3 Hardware Information (AD9431DN-24X)

### Appearance

**NOTE**

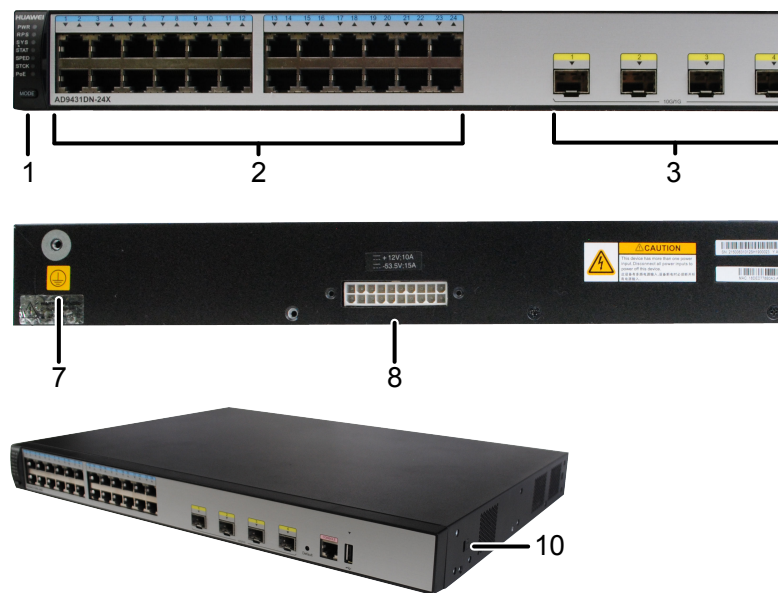
The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

**Figure 5-13** Appearance of the AD9431DN-24X



## Ports

Figure 5-14 Ports on the AD9431DN-24X





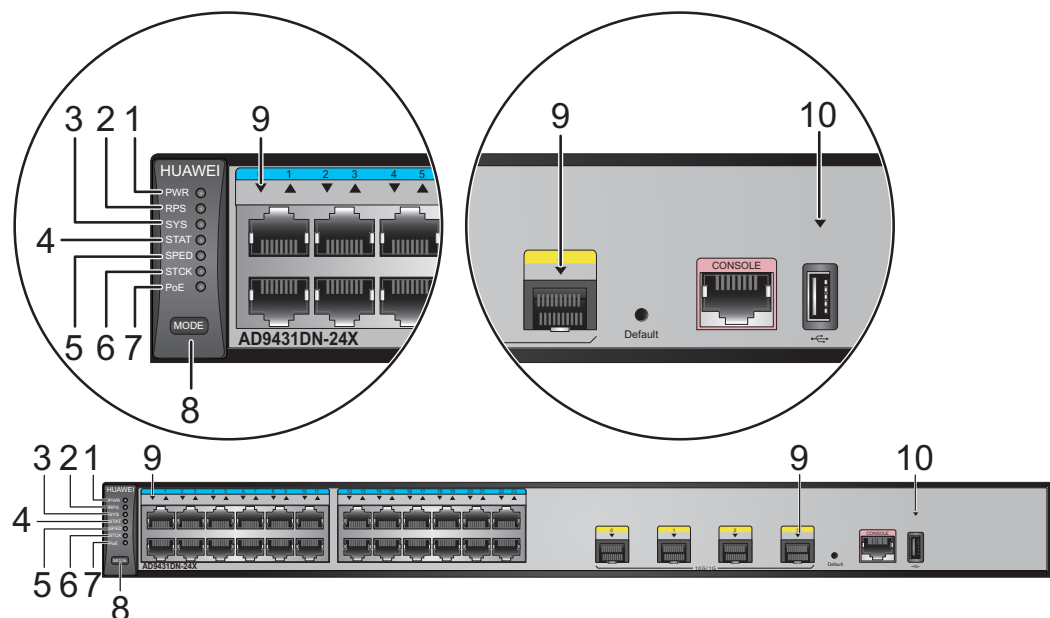
As shown in **Figure 5-14**, each port can be described as follows:

1. MODE: Switches the working mode of indicators when you press it.
2. 10/100/1000BASE-T Ethernet port: Twenty-four downlink network ports that support 10/100/1000Mbit/s auto-sensing and PoE output.
3. SFP+: Four 10GE optical ports that support the 100M/1000M/10GE optical module and high-speed cables (1 m, 3 m, or 5 m).
4. Default: Restores factory settings and restarts the device when you hold down the button more than 3 seconds.
5. CONSOLE: Connects to a maintenance terminal for AP configuration and management.
6. USB: Connects to a USB flash drive to transfer the configuration and upgrade files. The USB2.0 standard is supported.
7. Device ground screw: Connects the device to a ground cable.
8. RPS power jack: Connects to the power supply through a DC power output port on the RPS1800 chassis for power supply backup.
9. AC power jack: Connects to the power supply through an AC power cable.
10. Security slot: Connects to a security lock.

## Indicator

**Figure 5-15** shows the indicators on the AD9431DN-24X front panel.

**Figure 5-15** Indicators on the AD9431DN-24X front panel



**Table 5-7** describes indicators on the AD9431DN-24X front panel.

### NOTE

Indicator colors may vary slightly at different temperature.

**Table 5-7** Description of indicators on the AD9431DN-24X front panel

| No. | Indicator/<br>Button                 | Color  | Description  |
|-----|--------------------------------------|--------|--|
| 1   | PWR: internal power supply indicator | -      | Off: The switch is powered off.  |
|     |                                      | Green  | Steady on: The switch is powered on.   |
|     |                                      | Yellow | Steady on: The built-in power module is faulty, and the switch is powered by the RPS system.   |
| 2   | RPS: RPS power supply indicator      | -      | Off: No RPS is connected to the central AP.  |
|     |                                      | Green  | <ul style="list-style-type: none"> <li>Steady on: The RPS is in cold standby state.</li> <li>Blinking: The RPS is providing power for another device.</li> </ul>   |
|     |                                      | Yellow | <ul style="list-style-type: none"> <li>Steady on: The RPS is in alarm state. (No 870 W PoE power module is available in the RPS1800 or the RPS1800 cannot provide power supply to the local central AP at this time.)</li> <li>Blinking: The RPS is providing power for the central AP and the built-in power module of the central AP is faulty.</li> </ul> |
| 3   | SYS: system status indicator         | -      | Off: The system is not running.  |
|     |                                      | Green  | <ul style="list-style-type: none"> <li>Fast blinking: The system is starting.</li> <li>Slow blinking: The system is running normally.</li> </ul>   |
|     |                                      | Red    | Steady on: The system does not work normally after registration, or a fan or temperature alarm has been generated.   |
| 4   | STAT: status indicator               | Green  | <ul style="list-style-type: none"> <li>Off: The status mode is not selected.</li> <li>Steady on: The status mode (default mode) is selected. If the status mode is selected, the service port indicator shows the port link or activity state.</li> </ul>  |

| No. | Indicator/<br>Button     | Color    | Description   |
|-----|--------------------------|----------|---|
| 5   | SPED: speed indicator    | Green    | <ul style="list-style-type: none"> <li>Off: The speed mode is not selected.</li> <li>Steady on: The speed mode is selected. If the speed mode is selected, the service port indicator shows the port speed state. After 45 seconds, the service port indicators automatically restore to the status mode.</li> </ul>  |
| 6   | STCK: stack indicator    | Reserved |   |
| 7   | PoE: PoE indicator       | Green    | <ul style="list-style-type: none"> <li>Off: The PoE mode is not selected.</li> <li>Steady on: The service port indicators show the PoE status. After 45 seconds, the service port indicators automatically restore to the status mode.</li> </ul>   |
| 8   | MODE: mode switch button | -        | <ul style="list-style-type: none"> <li>When you press this button once, the service port indicators change to the speed mode and show the speed of each service port.</li> <li>When you press this button a second time, the service port indicators change to the stack mode and show the stack ID of the local switch.</li> <li>When you press this button a third time, the service port indicators change to PoE mode and show the PoE status of ports.</li> <li>When you press this button a fourth time, the service port indicators restore to the default mode, and the STAT indicator turns green.</li> </ul> <p>If you do not press the MODE button within 45 seconds, the service port indicators restore to the default mode. In this case, the STAT indicator is steady green, the SPED and PoE indicators are off, and the STCK indicator is off or blinking green.</p> |

| No. | Indicator/<br>Button   | Color    | Description   |
|-----|--|----------|---|
| 9   | Service port indicator <ul style="list-style-type: none"> <li>• GE electrical ports: The ports are numbered from bottom to top and left to right, starting with 0.</li> <li>• 10GE optical ports: Arrowheads show the positions of ports.</li> </ul> |          | Meanings of service port indicators vary in different modes. For details, see <a href="#">Table 5-8</a> . |
| 10  | USB indicator  | Reserved |   |

**Table 5-8** Description of service interface indicators in different modes

| Display Mode | Color | Description  |
|--------------|-------|--|
| Status       | Green | <ul style="list-style-type: none"> <li>• Off: The port is not connected or has been shut down.</li> <li>• Steady on: The port is connected.</li> <li>• Blinking: The port is sending or receiving data.</li> </ul>                 |
| Speed        | Green | <ul style="list-style-type: none"> <li>• Off: The port is not connected or has been shut down.</li> <li>• Steady on: The port is operating at 10/100 Mbit/s.</li> <li>• Blinking: The port is operating at 1000 Mbit/s.</li> </ul> |

| Display Mode | Color | Description   |
|--------------|-------|---|
| PoE          | Green | <ul style="list-style-type: none"> <li>Off: The port does not provide PoE power.</li> <li>Steady on: The port is providing PoE power.</li> <li>Blinking: The power of the PD exceeds the power supply capability of the port or exceeds the threshold. Or the PD does not comply with PoE.</li> </ul> |

## Basic Specifications

**Table 5-9** Basic specifications

| Item                       |                           | Description  |
|----------------------------|---------------------------|--|
| Physical specifications    | Dimensions (H x W x D)    | 43.6 mm × 442 mm × 310 mm  |
|                            | Weight                    | 4.3 kg   |
|                            | System memory             | 512 MB DDR3  |
|                            | FLASH                     | 4 MB NOR FLASH + 512 MB NAND   |
| Power specifications       | Power input               | <ul style="list-style-type: none"> <li>Rated voltage: 100 V AC to 240 V AC, 50/60 Hz</li> <li>Maximum voltage range: 90 V AC to 264 V AC, 47 Hz to 63 Hz</li> </ul>                  |
|                            | Maximum power consumption | 410 W (device power consumption: 30 W, PoE out: 370 W)   |
| Environment specifications | Operating temperature     | <ul style="list-style-type: none"> <li>-60 m to +1800 m: 0°C to +45°C</li> <li>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases by 300 m.</li> </ul> |
|                            | Storage temperature       | -40°C to +70°C   |
|                            | Operating humidity        | 5% to 95% (non-condensing)   |
|                            | IP rating                 | IP20   |
|                            | Atmospheric pressure      | 53 kPa to 106 kPa  |

## 5.2.4 Performance Specifications (AD9431DN-24X)

For AP performance specifications, log in to [Huawei official website](#) and download the brochure of the corresponding AP model, or query the specifications using [Info-Finder](#).

## 5.3 R230D and R240D Product Description

### 5.3.1 Product Characteristics (R230D, R240D)

The R230D and R240D are remote units (RUs) used in Huawei agile distributed Wi-Fi solution. They support PoE power supply, and are deployed indoors and connected to the central AP. The central AP and RUs are connected through network cables, which greatly extends the coverage range, enhances flexibility in AP deployment and planning, and reduces the engineering construction costs. The central AP manages the RUs and processes services in a centralized manner. The RUs process radio signals independently. Such distributed architecture further improves the wireless access capability, creating optimal service experience for users.

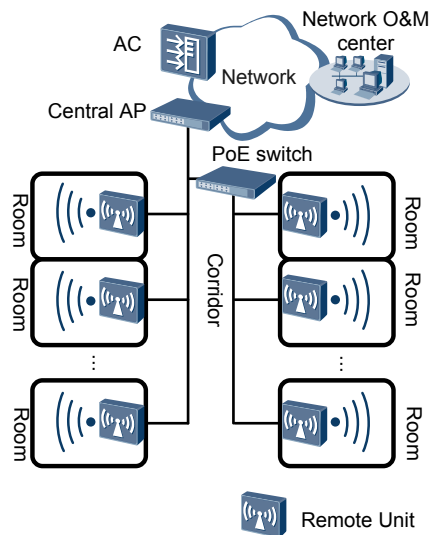
The RU uses an 86 mm plate in compliance with international standards and can be easily installed into a junction box in a room. It is equipped with a built-in antenna and a hidden indicator; therefore, installation of the RU does not affect indoor decorations and designs. It also has an IEEE 802.11a/b/g/n/ac wireless module and can work on both 5 GHz and 2.4 GHz frequency bands.

The RU is recommended for environments with complex wall structures and high-density rooms, such as schools, hotels, hospitals, and office meeting rooms. Signals are transmitted through network cables without attenuation. The RUs are deployed indoors and provide comprehensive signal coverage.

The RUs are managed by the central AP. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.

### 5.3.2 Usage Scenarios (R230D, R240D)

Figure 5-16 Distributed wireless access



As shown in the figure, the downlink GE interfaces of the central AP support PoE power supply and can be directly connected to RUs. The central AP can connect to

more RUs through a PoE switch. RUs are deployed indoors and communicate with the central AP through network cables.

### 5.3.3 Hardware Information (R230D)

#### Appearance

**Figure 5-17** shows the appearance of the R230D.

 **NOTE**

The actual device appearance may be different from the following device appearance; these differences will not affect device functions.

**Figure 5-17** R230D appearance



#### Port

The following figure shows ports on the R230D.



Figure 5-18 R230D ports



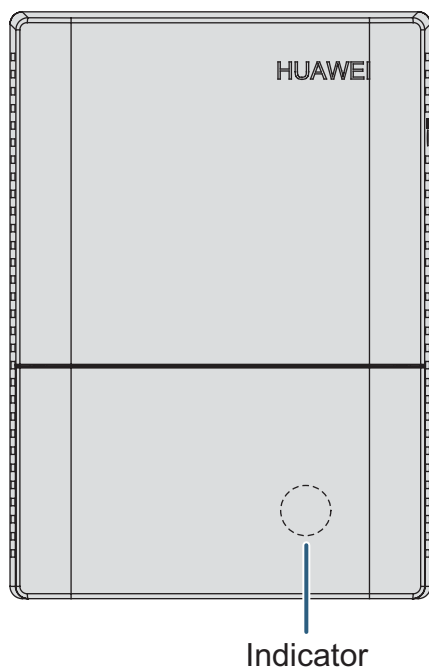
As shown in [Figure 5-18](#), each port can be described as follows:

1. ETH/PoE: 10/100M port used to connect to the wired Ethernet. The port can connect to a PoE power supply to provide power for the RU.
2. Default: Reset button used to restore factory settings if you hold down the button more than 3 seconds.

## LED Indicator

The R230D provides only one indicator, as shown in [Figure 5-19](#).

Figure 5-19 Indicator on the R230D



 **NOTE**

- The indicator is located inside the panel, which turns on after the AP is powered on.
- Indicator colors may vary slightly at different temperature.

**Table 5-10** Description of the indicator on the R230D

| Type      | Name | Color | Status                           | Description   |
|-----------|------|-------|----------------------------------|---|
| Indicator | -    | Green | Steady on                        | Default status after power-on.<br>The AP is just powered on and the software is not started yet.  |
|           | -    | Green | Steady on after blinking once    | Software startup status.<br>After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green.   |
|           | -    | Green | Blinking once every 2s (0.5 Hz)  | Running status.<br>The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.  |
|           |      |       | Blinking once every 5s (0.2 Hz)  | Running status.<br>The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.   |
|           | -    | Green | Blinking once every 0.25s (4 Hz) | Alarm. <ul style="list-style-type: none"> <li>• The software is being upgraded.</li> <li>• After the software is uploaded and started, the AP working in Fit AP mode requests to go online on the AC and maintains this state until it goes online successfully on the AC (before the CAPWAP link is established).</li> <li>• The AP registration fails (the CAPWAP link is disconnected).</li> </ul> |
|           | -    | Red   | Steady on                        | Fault.<br>A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.  |

## Basic Specifications

**Table 5-11** Basic specifications of the R230D

| Item                       | Description                        |  |
|----------------------------|------------------------------------|--|
| Technical specifications   | Dimensions (H x W x D)             | 26 mm x 120 mm x 86 mm (1.02 in. x 4.72 in. x 3.39 in.)  |
|                            | Weight                             | 0.1 kg   |
|                            | System memory                      | <ul style="list-style-type: none"> <li>• 128 MB DDR2</li> <li>• 32 MB flash memory</li> </ul>  |
| Power parameters           | Power input                        | <ul style="list-style-type: none"> <li>• PoE power supply in compliance with IEEE 802.3af</li> </ul>   |
|                            | Maximum power consumption          | 5.1 W<br><b>NOTE</b><br>The actual maximum power consumption depends on local laws and regulations.  |
| Environment specifications | Operating temperature and altitude | -60 m to 1800 m: 0°C to 40°C<br>1,800 m to 5,000 m: The highest operating temperature reduces by 1°C every time the altitude increases by 300 m. |
|                            | Storage temperature                | -40°C to +70°C   |
|                            | Operating humidity                 | 5% to 95% (non-condensing)   |
|                            | Atmospheric pressure               | 70 kPa to 106 kPa  |

## Radio Specifications

**Table 5-12** Radio specifications

| Item         | Description                      |
|--------------|----------------------------------|
| Antenna type | Built-in omnidirectional antenna |

| Item                                       | Description  |   |  |
|--|--|---|--|
| Antenna gain                               | <ul style="list-style-type: none"> <li>2.4 GHz: 3 dBi</li> <li>5 GHz: 4 dBi</li> </ul>   |   |  |
| Maximum number of users                    | ≤ 256  |   |  |
| Maximum number of VAPs for each radio      | 8  |   |  |
| Maximum transmit power                     | <ul style="list-style-type: none"> <li>2.4 GHz: 20 dBm (combined power)</li> <li>5 GHz: 18 dBm (combined power)</li> </ul> <b>NOTE</b><br>The actual transmit power depends on local laws and regulations.   |   |  |
| Maximum number of non-overlapping channels | 2.4 GHz (2.412 GHz to 2.472 GHz) <ul style="list-style-type: none"> <li>802.11b/g               <ul style="list-style-type: none"> <li>20 MHz: 3</li> </ul> </li> <li>802.11n               <ul style="list-style-type: none"> <li>20 MHz: 3</li> <li>40 MHz: 1</li> </ul> </li> </ul> | 5 GHz (5.18 GHz to 5.825 GHz) <ul style="list-style-type: none"> <li>802.11a               <ul style="list-style-type: none"> <li>20 MHz: 13</li> </ul> </li> <li>802.11n               <ul style="list-style-type: none"> <li>20 MHz: 13</li> <li>40 MHz: 6</li> </ul> </li> <li>802.11ac               <ul style="list-style-type: none"> <li>20 MHz: 13</li> <li>40 MHz: 6</li> <li>80 MHz: 3</li> </ul> </li> </ul> | <b>NOTE</b><br>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i> . |
| Channel rate                               | <ul style="list-style-type: none"> <li>802.11b: 1, 2, 5.5, and 11 Mbit/s</li> <li>802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li> <li>802.11n: 6.5 to 300 Mbit/s</li> <li>802.11ac: 6.5 to 867 Mbit/s</li> </ul>   |   |  |

### 5.3.4 Hardware Information (R240D)

#### Appearance

Figure 5-20 shows the appearance of the device.

 **NOTE**

The actual device appearance may be different from the following device appearance; these differences will not affect device functions.

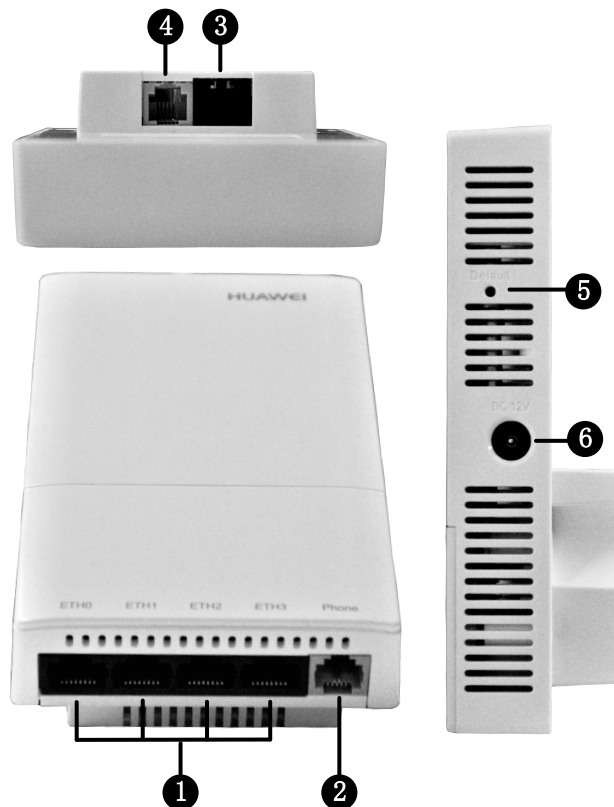
**Figure 5-20** Appearance



**Port**

**Figure 5-21** shows ports on the device.

Figure 5-21 Ports



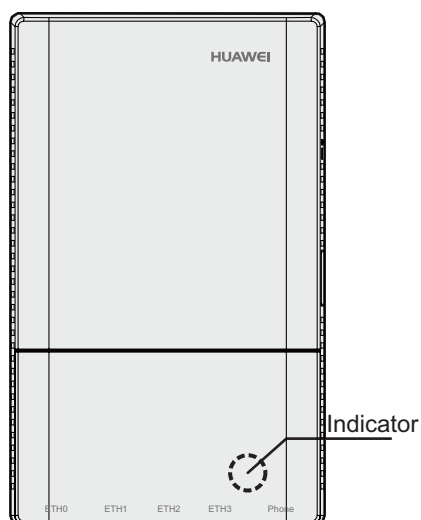
Each port can be described as follows:

1. ETH0 to ETH3: 10/100M port used to connect to the wired Ethernet.
2. Phone: Phone interface used to connect to a POTS phone or modem device.
3. GE/PoE: 10/100/1000M port used to connect to the wired Ethernet. The port can connect to a PoE power supply to provide power for the device.
4. Phone: Phone interface used to connect to a traditional PSTN.
5. Default: Reset button used to restore factory settings if you hold down the button more than 3 seconds.
6. Power input interface: 12 V DC.

## LED Indicator

R240D provides only one indicator, as shown in [Figure 5-22](#).

**Figure 5-22** Indicator on the R240D



**NOTE**

- The indicator is located inside the panel, which turns on after the AP is powered on.
- Indicator colors may vary slightly at different temperature.

**Table 5-13** Description about the single indicator

| Type      | Name | Color | Status                          | Description   |
|-----------|------|-------|---------------------------------|---|
| Indicator | -    | Green | Steady on                       | Default status after power-on.<br>The AP is just powered on and the software is not started yet.  |
|           | -    | Green | Steady on after blinking once   | Software startup status.<br>After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green. |
|           | -    | Green | Blinking once every 2s (0.5 Hz) | Running status.<br>The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.  |
|           | -    |       | Blinking once every 5s (0.2 Hz) | Running status.<br>The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.                                 |

| Type | Name | Color | Status                                       | Description   |
|------|------|-------|--|---|
|      | -    | Green | Blinking once Alarm Green every 0.25s (4 Hz) | Alarm. <ul style="list-style-type: none"> <li>The software is being upgraded.</li> <li>After the software is uploaded and started, the AP working in Fit AP mode requests to go online on the AC and maintains this state until it goes online successfully on the AC (before the CAPWAP link is established).</li> <li>The AP registration fails (the CAPWAP link is disconnected).</li> </ul> |
|      | -    | Red   | Steady on                                    | Fault.<br>A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.  |

## Basic Specifications

Table 5-14 Basic specifications of the R240D

| Item                     | Description                             |   |
|--------------------------|---|---|
| Technical specifications | Dimensions outside the wall (H × W × D) | 25 mm x 140 mm x 86 mm (0.98 in. x 5.51 in. x 3.39 in.)   |
|                          | Dimensions inside the wall (H × W × D)  | 16.5 mm x 51.5 mm x 63.5 mm (0.65 in. x 2.03 in. x 2.50 in.)  |
|                          | Weight                                  | 0.2 kg  |
|                          | System memory                           | <ul style="list-style-type: none"> <li>128 MB DDR2</li> <li>32 MB Flash</li> </ul>                                  |
| Power specifications     | Power input                             | <ul style="list-style-type: none"> <li>12 V ± 10%</li> <li>PoE power: in compliance with IEEE 802.3af/at</li> </ul> |



| Item                       |                                    | Description   |
|----------------------------|------------------------------------|---|
|                            | Maximum power consumption          | 8.7 W<br><b>NOTE</b><br>The actual maximum power consumption depends on local laws and regulations.                       |
| Environment specifications | Operating temperature and altitude | -60 m to +1800 m: 0°C to +40°C<br>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m. |
|                            | Storage temperature                | -40°C to +70°C  |
|                            | Operating humidity                 | 5% to 95% (non-condensing)  |
|                            | Atmospheric pressure               | 70 kPa to 106 kPa   |

## Radio Specifications

**Table 5-15** Radio specifications

| Item                                  | Description  |
|---------------------------------------|--|
| Antenna type                          | Built-in omnidirectional antenna   |
| Antenna gain                          | <ul style="list-style-type: none"> <li>• 2.4 GHz: 2 dBi</li> <li>• 5 GHz: 3 dBi</li> </ul>   |
| Maximum number of users               | ≤ 256  |
| Maximum number of VAPs for each radio | 8  |
| Maximum transmit power                | <ul style="list-style-type: none"> <li>• 2.4 GHz: 21 dBm (combined power)</li> <li>• 5 GHz: 20 dBm (combined power)</li> </ul> <b>NOTE</b><br>The actual transmit power depends on local laws and regulations. The R240D uses an 86-type box and applies only to countries and regions that support 86-type boxes. |

| Item                                       | Description  |   |  |
|--|--|---|--|
| Maximum number of non-overlapping channels | 2.4 GHz (2.412 GHz to 2.472 GHz) <ul style="list-style-type: none"> <li>● 802.11b/g                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> <li>- 40 MHz: 1</li> </ul> </li> </ul> | 5 GHz (5.18 GHz to 5.825 GHz) <ul style="list-style-type: none"> <li>● 802.11a                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> </ul> </li> <li>● 802.11ac                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> <li>- 80 MHz: 3</li> </ul> </li> </ul> | <b>NOTE</b><br>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i> . |
| Channel rate                               | <ul style="list-style-type: none"> <li>● 802.11b: 1, 2, 5.5, and 11 Mbit/s</li> <li>● 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li> <li>● 802.11n: 6.5 to 300 Mbit/s</li> <li>● 802.11ac: 6.5 to 867 Mbit/s</li> </ul>   |   |  |

### 5.3.5 Performance Specifications (R230D, R240D)

For AP performance specifications, log in to [Huawei official website](#) and download the brochure of the corresponding AP model, or query the specifications using [Info-Finder](#).

## 5.4 R250D and R250D-E Product Description

### 5.4.1 Product Characteristics (R250D and R250D-E)

The R250D and R250D-E are remote units (RUs) used in Huawei agile distributed Wi-Fi solution. They support PoE power supply, and are deployed indoors and connected to the central AP. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.

The RU uses an 86 mm plate in compliance with international standards and can be easily installed into a junction box in a room. It is equipped with a built-in

antenna and a hidden indicator; therefore, installation of the RU does not affect indoor decorations and designs. It also has an IEEE 802.11a/b/g/n/ac/ac Wave 2 wireless module and can work on both 5 GHz and 2.4 GHz frequency bands.

The RU is recommended for environments with complex wall structures and high-density rooms, such as schools, hotels, hospitals, and office meeting rooms. Signals are transmitted through network cables without attenuation. The RUs are deployed indoors and provide comprehensive signal coverage.

The RUs are managed by the central AP. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.

## **Long-Distance Network Coverage**

Unlike the traditional distributed AP which allows for a maximum feeder length of 15 m, the central AP uses network cables to replace feeder cables and supports up to 100 m distance from the RUs. The network coverage range is therefore expanded by several times.

## **No Wall Penetration Loss, No Coverage Hole**

Restricted by feeder length or installation requirements, signals have to pass through walls in some scenarios, resulting in large signal attenuation. If rooms to be covered have complex structures, coverage holes may occur. To prevent these problems, lots of calculation and verification work needs to be carried out. Huawei distributed solution solves these problems. In this solution, RUs are placed in rooms, and signals are transmitted over wired cables, without wall penetration loss, delivering high-quality wireless access services.

## **802.11ac/ac Wave 2 Gigabit Wireless Rate**

The RU complies with IEEE 802.11a/b/g/n/ac/ac Wave 2, supports 2x2 MIMO, works on both 2.4 and 5 GHz frequency bands, and provides strong signals and gigabit wireless rate.

## **Unique, Graceful Plate Design**

The RU is white in appearance and has heat emission holes and interfaces at the side and bottom. The mounting screws are hidden under the slide panel. The overall design is simple but graceful and blends well with the layout of hotels and apartments.

## **Easy to Install in a Standard Junction Box (86 mm)**

The RU uses an 86 mm plate in compliance with international standards and can be easily installed into a junction box in a room, requiring no drilling or cabling.

## Flexible Installation Modes

In addition to a junction box (86 mm), the R250D can be installed on a wall or ceiling, and the R250D-E can be installed on a desk, rendering the installation location flexible.

## Hidden Indicator, Zero Impact on Sleep

The RU uses a hidden indicator design. When being turned on, the indicator has soft light. The AC controls the switch of the indicator and turns off the indicator at nights to prevent blinking lights from affecting sleep of guests.

## Four Downlink Ethernet Interfaces, Supporting Wired Access from Multiple Users

The R250D-E has four downlink 1000M Ethernet interfaces that can process data concurrently. The interfaces can be connected to multiple terminals through network cables, such as the IPTV, desktop computer, and laptop, meeting requirements of hotels and apartments. One downlink 1000M Ethernet interface supports PoE out and can provide power supply for connected devices such as IP phones.

## Auto Shutdown of the Wired Interface

In some cases, a loop may occur on a network connected to the RU's wired interface, for example, when the RU and the network are connected through a hub. The auto shutdown function enables the RU to automatically shut down its wired interface for protection.

### NOTE

This function takes effect only when the wired network connected to the RU's wired interface does not terminate STP packets from the RU.

## Low Engineering Cost

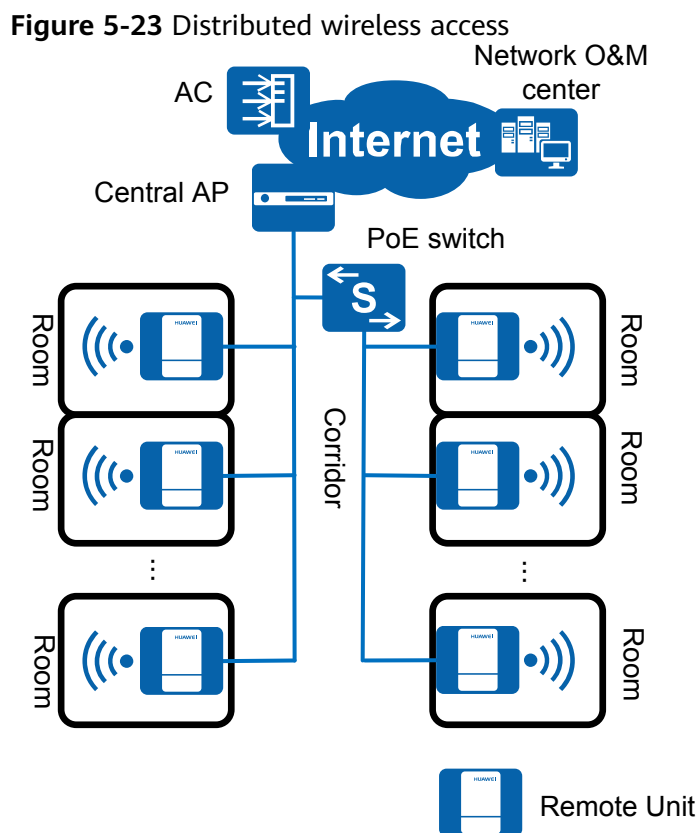
Compared with traditional distributed APs, the central AP cuts down the following expenses:

- Construction: Network cables replace expensive feeder cables. The central AP can directly use the network cables originally routed in the rooms, without the need of deploying new cables.
- License: The maximum number of central APs in Fit mode allowed by the AC is controlled by licenses, but RUs do not require licenses. Therefore, one central AP can use RUs to cover dozens of rooms.

## Hierarchical Processing Technology, High Wireless Forwarding Capability

Huawei distributed solution uses innovative hierarchical processing technology. The central AP manages RUs in a centralized manner and concurrently forwards service traffic, while the RUs only process radio signals. The hierarchical design makes the network structure clearer and reduces the processing burden on the central AP and RUs, improving efficiency and optimizing the overall wireless forwarding performance.

## 5.4.2 Usage Scenarios (R250D and R250D-E)



As shown in the figure, the downlink GE interfaces of the central AP support PoE power supply and can be directly connected to RUs. The central AP can connect to more RUs through a PoE switch. RUs are deployed indoors and communicate with the central AP through network cables.

## 5.4.3 Hardware Information (R250D)

### Appearance

#### NOTE

The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

**Figure 5-24** R250D appearance



## Ports

**Figure 5-25** R250D ports



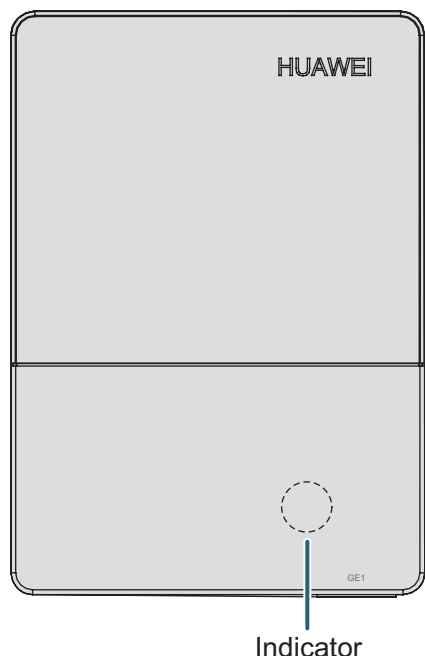
As shown in [Figure 5-24](#), each port can be described as follows:

1. GE1: 10/100/1000M port used to connect to the wired Ethernet.
2. Default: Reset button used to restore factory settings and restarts the device if you hold down the button more than 3 seconds.
3. GE0/PoE\_IN: 10/100/1000M port used to connect to the wired Ethernet and support PoE input.

## Indicator

The R250D provides only one indicator, as shown in [Figure 5-26](#).

**Figure 5-26** Indicator



### NOTE

- The indicator is located inside the panel, which turns on after the AP is powered on.
- Indicator colors may vary slightly at different temperature.

**Table 5-16** Description about the single indicator

| Type      | Name | Color | Status                          | Description   |
|-----------|------|-------|---------------------------------|---|
| Indicator | -    | Green | Steady on                       | Default status after power-on.<br>The AP is just powered on and the software is not started yet.  |
|           | -    | Green | Steady on after blinking once   | Software startup status.<br>After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green. |
|           | -    | Green | Blinking once every 2s (0.5 Hz) | Running status.<br>The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.  |

| Type | Name | Color | Status                                       | Description   |
|------|------|-------|--|---|
|      |      |       | Blinking once every 5s (0.2 Hz)              | Running status.<br>The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.   |
|      | -    | Green | Blinking once Alarm Green every 0.25s (4 Hz) | Alarm. <ul style="list-style-type: none"> <li>The software is being upgraded.</li> <li>After the software is uploaded and started, the AP working in Fit AP mode requests to go online on the AC and maintains this state until it goes online successfully on the AC (before the CAPWAP link is established).</li> <li>The AP registration fails (the CAPWAP link is disconnected).</li> </ul> |
|      | -    | Red   | Steady on                                    | Fault.<br>A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.  |

## Basic Specifications

Table 5-17 R250D Basic specifications

| Item                    |                           | Description  |
|-------------------------|---------------------------|--|
| Physical specifications | Dimensions (H x W x D)    | 26 mm x 86 mm x 120 mm   |
|                         | Weight                    | 0.2 kg   |
|                         | System memory             | <ul style="list-style-type: none"> <li>256 MB DDR3L</li> <li>32 MB Flash</li> </ul>                  |
| Power specifications    | Power input               | PoE power supply: in compliance with IEEE 802.3af/at   |
|                         | Maximum power consumption | 10.1 W<br><b>NOTE</b><br>The actual maximum power consumption depends on local laws and regulations. |



| Item                       |                       | Description   |
|----------------------------|-----------------------|---|
| Environment specifications | Operating temperature | <ul style="list-style-type: none"> <li>-60 m to +1800 m: 0°C to +40°C</li> <li>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m.</li> </ul> |
|                            | Storage temperature   | -40°C to +70°C  |
|                            | Operating humidity    | 5% to 95% (non-condensing)  |
|                            | Atmospheric pressure  | 53 kPa to 106 kPa   |

## Radio Specifications

**Table 5-18** Radio specifications

| Item                                  | Description  |
|---------------------------------------|--|
| Antenna type                          | Built-in omnidirectional antenna   |
| Antenna gain                          | <ul style="list-style-type: none"> <li>2.4 GHz: 4 dBi</li> <li>5 GHz: 6 dBi</li> </ul>   |
| Maximum number of users               | <p>≤ 256</p> <p><b>NOTE</b><br/>The actual number of users varies according to the environment.</p>  |
| Maximum number of VAPs for each radio | 16   |
| Maximum transmit power                | <ul style="list-style-type: none"> <li>2.4 GHz: 21 dBm (combined power)</li> <li>5 GHz: 20 dBm (combined power)</li> </ul> <p><b>NOTE</b><br/>The actual transmit power depends on local laws and regulations.</p> |

| Item                                       | Description  |   |  |
|--|--|---|--|
| Maximum number of non-overlapping channels | 2.4 GHz (2.412 GHz to 2.472 GHz) <ul style="list-style-type: none"> <li>● 802.11b/g                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> <li>- 40 MHz: 1</li> </ul> </li> </ul> | 5 GHz (5.18 GHz to 5.825 GHz) <ul style="list-style-type: none"> <li>● 802.11a                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> </ul> </li> <li>● 802.11ac                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> <li>- 80 MHz: 3</li> </ul> </li> </ul> | <b>NOTE</b><br>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i> . |
| Channel rate                               | <ul style="list-style-type: none"> <li>● 802.11b: 1, 2, 5.5, and 11 Mbit/s</li> <li>● 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li> <li>● 802.11n: 6.5 to 400 Mbit/s</li> <li>● 802.11ac: 6.5 to 867 Mbit/s</li> </ul>   |   |  |

## 5.4.4 Hardware Information (R250D-E)

### Appearance

 **NOTE**

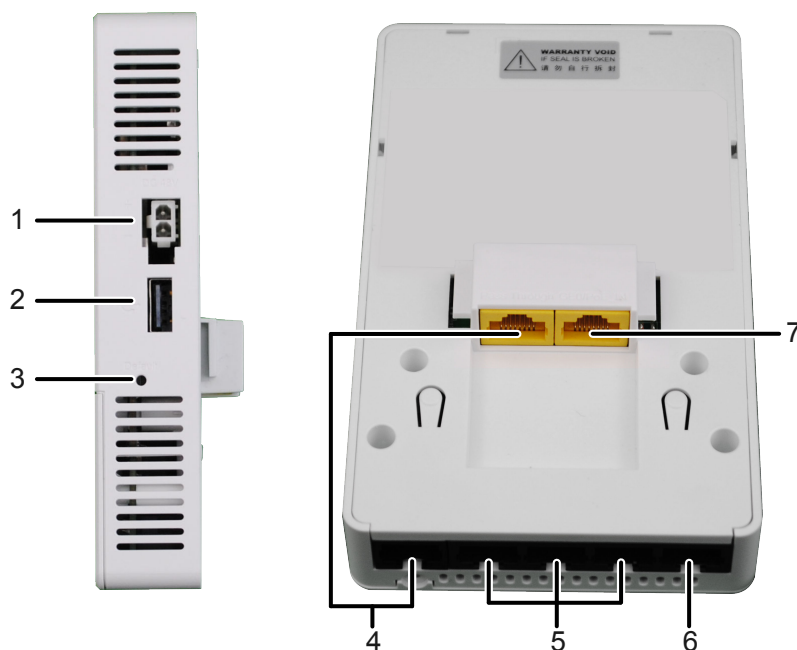
The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

Figure 5-27 R250D-E appearance



## Ports

Figure 5-28 R250D-E ports



As shown in [Figure 5-28](#), each port can be described as follows:

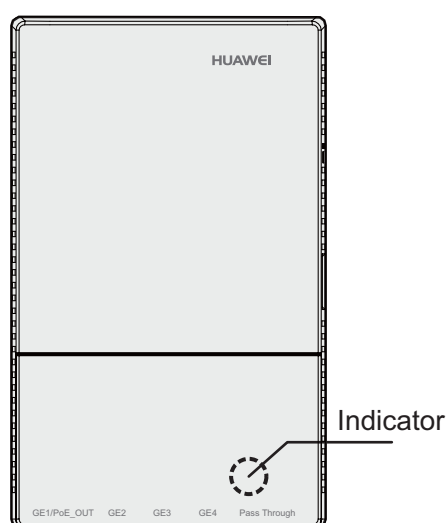
1. DC 48V: DC power socket connecting a 48 V power adapter to the AP.
2. USB: Connects to a USB flash drive or other storage devices to extend the storage space of the AP. The USB2.0 standard is supported.
3. Default button: Reset button used to restore factory settings and restarts the device if you hold down the button more than 3 seconds.

4. Pass Through port (RJ45): Connects to a network cable or phone cable for transparent transmission.
5. GE2 to GE4: 10/100/1000M port used to connect to the wired Ethernet.
6. GE1/PoE\_OUT: 10/100/1000M port used to connect to the wired Ethernet and support PoE output.
7. GE0/PoE\_IN: 10/100/1000M port used to connect to the wired Ethernet and support PoE input.

## LED Indicator

The R250D-E provides only a single indicator, as shown in [Figure 5-29](#).

**Figure 5-29** Indicator



### NOTE

- The indicator is located inside the panel, which turns on after the AP is powered on.
- Indicator colors may vary slightly at different temperature.

**Table 5-19** Description about the single indicator

| Type      | Name | Color | Status                        | Description   |
|-----------|------|-------|-------------------------------|---|
| Indicator | -    | Green | Steady on                     | Default status after power-on.<br>The AP is just powered on and the software is not started yet.  |
|           | -    | Green | Steady on after blinking once | Software startup status.<br>After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green. |

| Type | Name | Color     | Status   | Description   |
|------|------|-----------|--|---|
|      | -    | Green     | Blinking once every 2s (0.5 Hz)  | Running status.<br>The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.  |
|      |      |           | Blinking once every 5s (0.2 Hz)  | Running status.<br>The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.   |
|      | -    | Green     | Blinking once Alarm Green every 0.25s (4 Hz)   | Alarm. <ul style="list-style-type: none"> <li>The software is being upgraded.</li> <li>After the software is uploaded and started, the AP working in Fit AP mode requests to go online on the AC and maintains this state until it goes online successfully on the AC (before the CAPWAP link is established).</li> <li>The AP registration fails (the CAPWAP link is disconnected).</li> </ul> |
| -    | Red  | Steady on | Fault.<br>A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually. |   |

## Basic Specifications

Table 5-20 R250D-E Basic specifications

| Item                    |                        | Description   |
|-------------------------|------------------------|---|
| Physical specifications | Dimensions (H x W x D) | 36 mm x 86 mm x 140 mm  |
|                         | Weight                 | 0.26 kg   |
|                         | System memory          | <ul style="list-style-type: none"> <li>256 MB DDR3L</li> <li>32 MB Flash</li> </ul> |

| Item                       |                           | Description   |
|----------------------------|---------------------------|---|
| Power specifications       | Power input               | <ul style="list-style-type: none"> <li>DC: 48 V ± 5%</li> <li>PoE power supply: in compliance with IEEE 802.3af/at</li> </ul>   |
|                            | Maximum power consumption | 11.5 W (excluding the output power of the USB port and PoE_OUT port)<br><b>NOTE</b><br>The actual maximum power consumption depends on local laws and regulations.                |
| Environment specifications | Operating temperature     | <ul style="list-style-type: none"> <li>-60 m to +1800 m: 0°C to +40°C</li> <li>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m.</li> </ul> |
|                            | Storage temperature       | -40°C to +70°C  |
|                            | Operating humidity        | 5% to 95% (non-condensing)  |
|                            | Atmospheric pressure      | 53 kPa to 106 kPa   |

## Radio Specifications

Table 5-21 Radio specifications

| Item                                  | Description  |
|---------------------------------------|--|
| Antenna type                          | Built-in omnidirectional antenna   |
| Antenna gain                          | <ul style="list-style-type: none"> <li>2.4 GHz: 4 dBi</li> <li>5 GHz: 5 dBi</li> </ul>   |
| Maximum number of users               | ≤ 256<br><b>NOTE</b><br>The actual number of users varies according to the environment.  |
| Maximum number of VAPs for each radio | 16   |
| Maximum transmit power                | <ul style="list-style-type: none"> <li>2.4 GHz: 21 dBm (combined power)</li> <li>5 GHz: 20 dBm (combined power)</li> </ul> <b>NOTE</b><br>The actual transmit power depends on local laws and regulations. |

| Item                                       | Description  |   |  |
|--|--|---|--|
| Maximum number of non-overlapping channels | 2.4 GHz (2.412 GHz to 2.472 GHz) <ul style="list-style-type: none"> <li>● 802.11b/g                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> <li>- 40 MHz: 1</li> </ul> </li> </ul> | 5 GHz (5.18 GHz to 5.825 GHz) <ul style="list-style-type: none"> <li>● 802.11a                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> </ul> </li> <li>● 802.11ac                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> <li>- 80 MHz: 3</li> </ul> </li> </ul> | <b>NOTE</b><br>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i> . |
| Channel rate                               | <ul style="list-style-type: none"> <li>● 802.11b: 1, 2, 5.5, and 11 Mbit/s</li> <li>● 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li> <li>● 802.11n: 6.5 to 400 Mbit/s</li> <li>● 802.11ac: 6.5 to 867 Mbit/s</li> </ul>   |   |  |

## 5.4.5 Performance Specifications (R250D, R250D-E)

For AP performance specifications, log in to [Huawei official website](#) and download the brochure of the corresponding AP model, or query the specifications using [Info-Finder](#).

## 5.5 R251D and R251D-E Product Description

### 5.5.1 Product Characteristics (R251D, R251D-E)

Huawei R251D and R251D-E are remote units (RUs) used in Huawei agile distributed Wi-Fi solution. The RUs can receive PoE power supply, and are deployed in rooms and connected to a central AP. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.

The RUs can be easily installed in junction boxes (86 mm/120 mm/118 mm) without damaging indoor decoration. The hidden indicator design and the

optimized indicator luminance of the R251D and R251D-E reduce the light impact on users. The indicator can also be shut down through the software as required.

The R251D and R251D-E have an IEEE 802.11a/b/g/n/ac/ac Wave 2 wireless module and can work on both 5 GHz and 2.4 GHz frequency bands. The built-in smart antennas of the RUs help achieve better coverage.

The RU is recommended for environments with complex wall structures and high-density rooms, such as schools, hotels, hospitals, and office meeting rooms. Signals are transmitted through network cables without attenuation. The RUs are deployed indoors and provide comprehensive signal coverage.

The RUs are managed by the central AP. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.

## Long-Distance Network Coverage

Unlike the traditional distributed AP which allows for a maximum feeder length of 15 m, the central AP uses network cables to replace feeder cables and supports up to 100 m distance from the RUs. The network coverage range is therefore expanded by several times.

## No Wall Penetration Loss, No Coverage Hole

Restricted by feeder length or installation requirements, signals have to pass through walls in some scenarios, resulting in large signal attenuation. If rooms to be covered have complex structures, coverage holes may occur. To prevent these problems, lots of calculation and verification work needs to be carried out. Huawei distributed solution solves these problems. In this solution, RUs are placed in rooms, and signals are transmitted over wired cables, without wall penetration loss, delivering high-quality wireless access services.

## 802.11ac/ac Wave 2 Gigabit Wireless Rate

The RU complies with IEEE 802.11a/b/g/n/ac/ac wave2, supports 2x2 MIMO, works on both 2.4 and 5 GHz frequency bands, and provides strong signals and gigabit wireless rate.

## Unique, Graceful Plate Design

The RU is white in appearance and has heat emission holes and interfaces at the side and bottom. The mounting screws are hidden under the slide panel. The overall design is simple but graceful and blends well with the layout of hotels and apartments.

## Easy Installation in a Junction Box (86 mm/118 mm/120 mm)

RUs can be easily installed in a junction box (86 mm/118 mm/120 mm), without the need to drill holes or lay out cables.



## Flexible Installation Modes

RUs can also be installed on a wall or desktop, allowing for flexible installation.

## Hidden Indicator, Zero Impact on Sleep

The RU uses a hidden indicator design. When being turned on, the indicator has soft light. The AC controls the switch of the indicator and turns off the indicator at nights to prevent blinking lights from affecting sleep of guests.

## Four Downlink Ethernet Interfaces, Supporting Wired Access from Multiple Users

The R251D and R251D-E have four downlink GE interfaces that can process data concurrently. The interfaces can be connected to multiple STAs through Ethernet cables, such as the IPTV, desktop computer, and laptop, meeting requirements in hotels and apartments. One downlink GE interface of the R251D-E supports PoE out and can supply power to connected devices such as IP phones.

## Auto Shutdown of the Wired Interface

In some cases, a loop may occur on a network connected to the RU's wired interface, for example, when the RU and the network are connected through a hub. The auto shutdown function enables the RU to automatically shut down its wired interface for protection.

### NOTE

This function takes effect only when the wired network connected to the RU's wired interface does not terminate STP packets from the RU.

## Low Engineering Cost

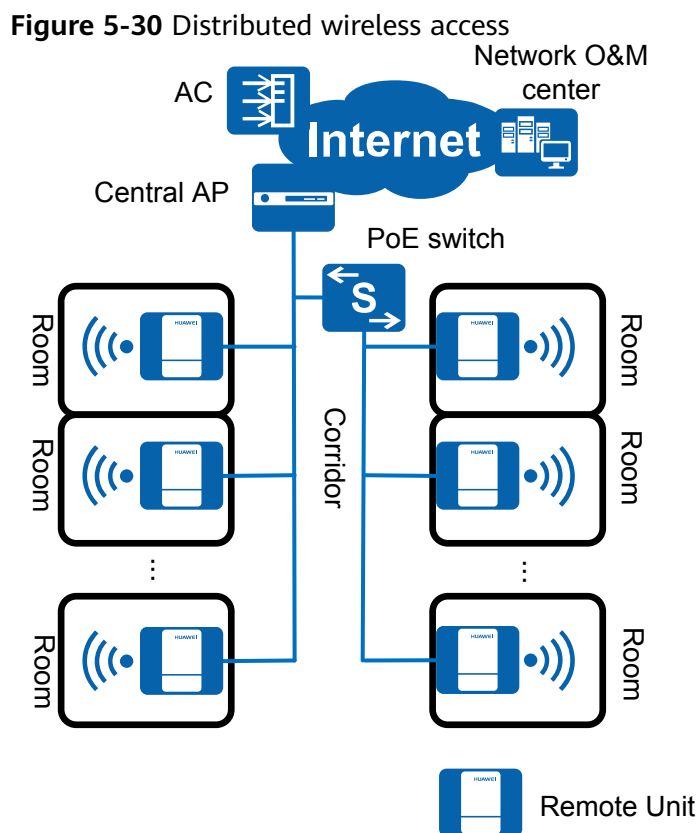
Compared with traditional distributed APs, the central AP cuts down the following expenses:

- Construction: Network cables replace expensive feeder cables. The central AP can directly use the network cables originally routed in the rooms, without the need of deploying new cables.
- License: The maximum number of central APs in Fit mode allowed by the AC is controlled by licenses, but RUs do not require licenses. Therefore, one central AP can use RUs to cover dozens of rooms.

## Hierarchical Processing Technology, High Wireless Forwarding Capability

Huawei distributed solution uses innovative hierarchical processing technology. The central AP manages RUs in a centralized manner and concurrently forwards service traffic, while the RUs only process radio signals. The hierarchical design makes the network structure clearer and reduces the processing burden on the central AP and RUs, improving efficiency and optimizing the overall wireless forwarding performance.

## 5.5.2 Usage Scenario (R251D, R251D-E)



As shown in the figure, the downlink GE interface of a central AP supports PoE power supply and can be directly connected to RUs. The central AP can connect to more RUs through a PoE switch. RUs are deployed indoors and communicate with the central AP through network cables.

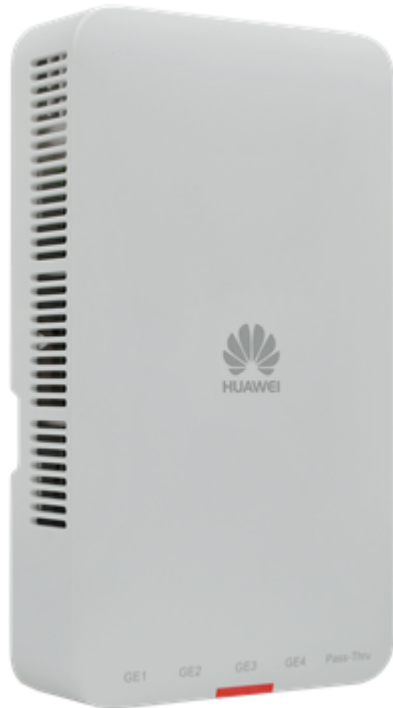
## 5.5.3 Hardware Information (R251D)

### Appearance

#### NOTE

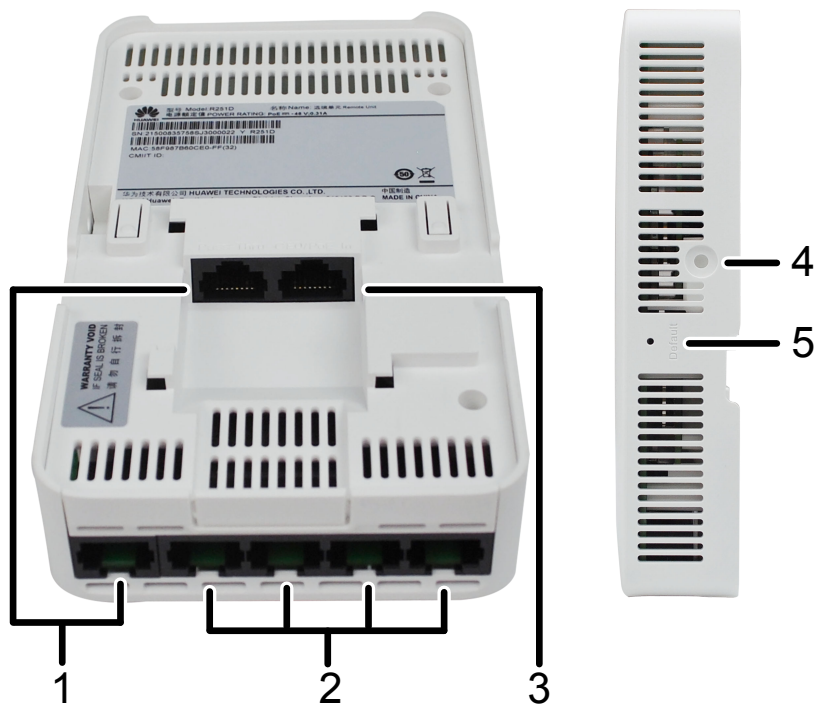
The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

Figure 5-31 Appearance



## Ports

Figure 5-32 Ports



As shown in [Figure 5-32](#), each port can be described as follows:

1. Pass Through: RJ45 ports that connect to network cables or phone cables for transparent transmission.
2. GE4 to GE1: 10/100/1000M port that connects to the wired Ethernet.
3. GE0/PoE\_IN: 10/100/1000M port that connects to the wired Ethernet and supports PoE input.
4. Captive screw hole: Accommodates a captive screw.

**NOTE**

Tighten an M3x4 crosshead screw into the device to prevent the device from dropping. If the anti-theft function is required, tighten an M3x4 torx screw (instead of an M3x4 crosshead screw) into the device using a T9 torx security screwdriver. The tightening torques of the two screw types are both 0.15 N•m.

5. Default: Restores factory settings and restarts the device when you hold down the button more than 3 seconds.

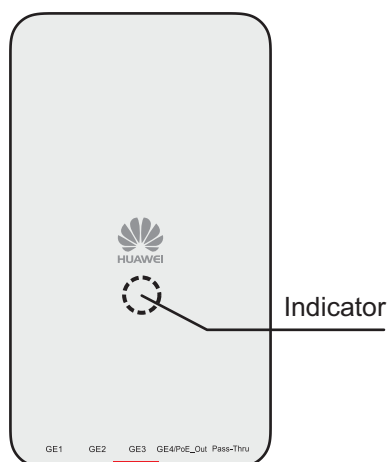
## LED Indicators

The R251D provides only one indicator, as shown in [Figure 5-33](#).

**NOTE**

- The indicator is located inside the panel, which turns on after the AP is powered on.
- Indicator colors may vary slightly at different temperature.

**Figure 5-33** Indicator



**Table 5-22** Description about the single indicator

| Indicator | Name | Color | Status    | Description   |
|-----------|------|-------|-----------|---|
| Indicator | -    | Green | Steady on | Default status after power-on. The AP is just powered on and the software is not started yet. |

| Indicator | Name | Color | Status                           | Description   |
|-----------|------|-------|----------------------------------|---|
| -         |      | Green | Steady on after blinking once    | Software startup status.<br>After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green.   |
| -         |      | Green | Blinking once every 2s (0.5 Hz)  | Running status. <ul style="list-style-type: none"> <li>The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.</li> <li>The system enters the Uboot CLI.</li> </ul>   |
| -         |      |       | Blinking once every 5s (0.2 Hz)  | Running status.<br>The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.   |
| -         |      | Green | Blinking once every 0.25s (4 Hz) | Alarm. <ul style="list-style-type: none"> <li>The software is being upgraded.</li> <li>After the software is loaded and started, the AP requests to go online if it works in Fit AP or cloud-based management mode. The indicator remains in this state before the AP successfully goes online.</li> <li>The AP works in Fit AP or cloud-based management mode and fails to go online.</li> </ul> |
| -         |      | Red   | Steady on                        | Fault.<br>A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.  |

## Basic Specifications

**Table 5-23** Basic specifications

| Item                       |                           | Description   |
|----------------------------|---------------------------|---|
| Physical specifications    | Dimensions (H x W x D)    | 32.5 mm x 86 mm x 150 mm (1.28 in. x 3.39 in. x 5.91 in.)   |
|                            | Weight                    | 0.25 kg   |
|                            | System memory             | 256 MB DDR3L  |
|                            | FLASH                     | 32 MB NOR FLASH   |
| Power specifications       | Power input               | PoE power supply: <ul style="list-style-type: none"> <li>• R251D: in compliance with IEEE 802.3af</li> <li>• R251D-E: in compliance with IEEE 802.3at</li> </ul>  |
|                            | Maximum power consumption | <ul style="list-style-type: none"> <li>• R251D: 11.5 W</li> <li>• R251D-E: 11.5 W (excluding the output power of the USB port and PoE_OUT port)</li> </ul> <b>NOTE</b><br>The actual maximum power consumption depends on local laws and regulations. |
| Environment specifications | Operating temperature     | <ul style="list-style-type: none"> <li>• -60 m to +1800 m: 0°C to +40°C</li> <li>• 1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m.</li> </ul>   |
|                            | Storage temperature       | -40°C to +70°C  |
|                            | Operating humidity        | 5% to 95% (non-condensing)  |
|                            | Atmospheric pressure      | 53 kPa to 106 kPa   |

## Radio Specifications

**Table 5-24** Radio specifications

| Item         | Description            |
|--------------|------------------------|
| Antenna type | Built-in smart antenna |

| Item                                       | Description   |  |   |
|--|---|--|---|
| Antenna gain                               | <ul style="list-style-type: none"> <li>● 2.4 GHz: 3 dBi</li> <li>● 5 GHz: 4 dBi</li> </ul> <p><b>NOTE</b><br/>Gain involves the physical gain and SINR enhancement of smart antennas.</p>   |  |   |
| Maximum number of users                    | <p>≤ 256</p> <p><b>NOTE</b><br/>The actual number of users varies according to the environment.</p>   |  |   |
| Maximum number of VAPs for each radio      | <p>16</p>   |  |   |
| Maximum transmit power                     | <ul style="list-style-type: none"> <li>● 2.4 GHz: 23 dBm (combined power)</li> <li>● 5 GHz: 23 dBm (combined power)</li> </ul> <p><b>NOTE</b><br/>The actual transmit power depends on local laws and regulations.</p>  |  |   |
| Maximum number of non-overlapping channels | <p>2.4 GHz (2.412 GHz to 2.472 GHz)</p> <ul style="list-style-type: none"> <li>● 802.11b/g                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> <li>- 40 MHz: 1</li> </ul> </li> </ul> | <p>5 GHz (5.18 GHz to 5.825 GHz)</p> <ul style="list-style-type: none"> <li>● 802.11a                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> </ul> </li> <li>● 802.11ac                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> <li>- 80 MHz: 3</li> </ul> </li> </ul> | <p><b>NOTE</b><br/>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i>.</p> |
| Channel rate                               | <ul style="list-style-type: none"> <li>● 802.11b: 1, 2, 5.5, and 11 Mbit/s</li> <li>● 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li> <li>● 802.11n: 6.5 to 400 Mbit/s</li> <li>● 802.11ac: 6.5 to 867 Mbit/s</li> </ul>  |  |   |

## 5.5.4 Hardware Information (R251D-E)

### Appearance

 NOTE

The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

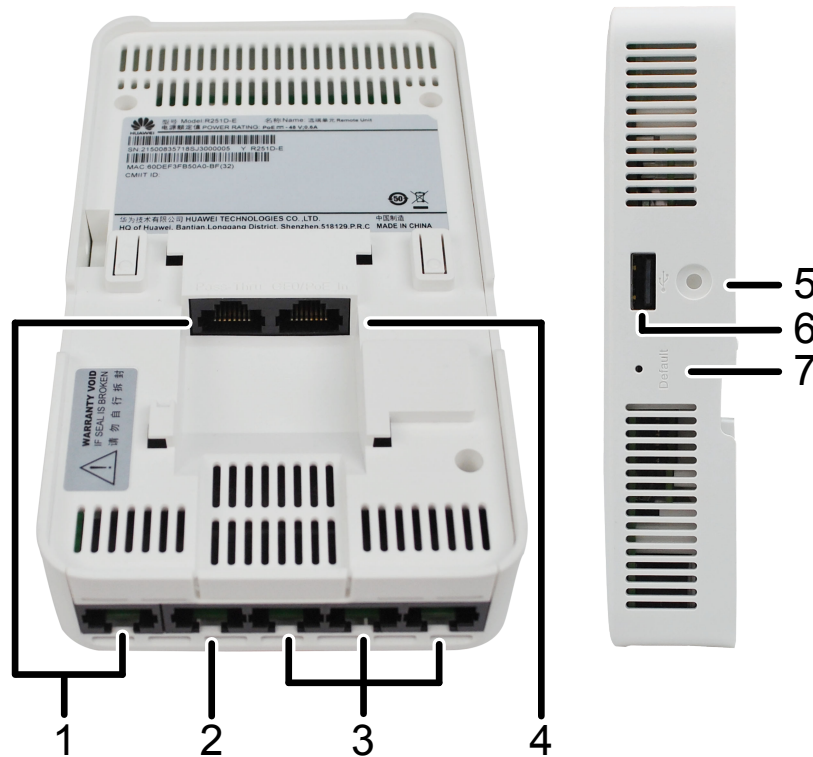
**Figure 5-34** Appearance





## Ports

Figure 5-35 Ports



As shown in [Figure 5-35](#), each port can be described as follows:

1. Pass Through: RJ45 ports that connect to network cables or phone cables for transparent transmission.
2. GE4/PoE\_Out: 10/100/1000M port that connects to the wired Ethernet and supports PoE output.
3. GE3 to GE1: 10/100/1000M port that connects to the wired Ethernet.
4. GE0/PoE\_IN: 10/100/1000M port that connects to the wired Ethernet and supports PoE input.
5. Captive screw hole: Accommodates a captive screw.

### NOTE

Tighten an M3x4 crosshead screw into the device to prevent the device from dropping. If the anti-theft function is required, tighten an M3x4 torx screw (instead of an M3x4 crosshead screw) into the device using a T9 torx security screwdriver. The tightening torques of the two screw types are both 0.15 N•m.

6. USB: Connects to a USB flash drive or other storage devices to extend the storage space of the AP. The USB2.0 standard is supported.
7. Default: Restores factory settings and restarts the device when you hold down the button more than 3 seconds.

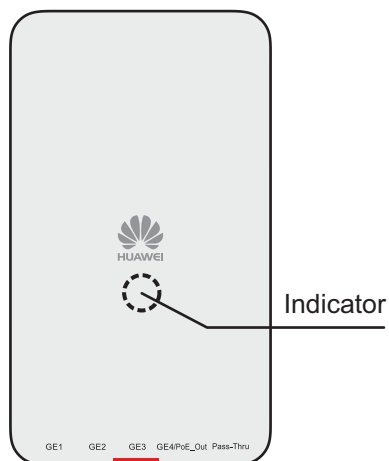
## LED Indicators

The R251D-E provides only one indicator, as shown in [Figure 5-36](#).

**NOTE**

- The indicator is located inside the panel, which turns on after the AP is powered on.
- Indicator colors may vary slightly at different temperature.

**Figure 5-36** Indicator



**Table 5-25** Description about the single indicator

| Indicator | Name | Color | Status                          | Description   |
|-----------|------|-------|---------------------------------|---|
| Indicator | -    | Green | Steady on                       | Default status after power-on.<br>The AP is just powered on and the software is not started yet.  |
|           | -    | Green | Steady on after blinking once   | Software startup status.<br>After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green.               |
|           | -    | Green | Blinking once every 2s (0.5 Hz) | Running status. <ul style="list-style-type: none"> <li>• The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.</li> <li>• The system enters the Uboot CLI.</li> </ul> |
|           | -    |       | Blinking once every 5s (0.2 Hz) | Running status.<br>The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.   |

| Indicator | Name | Color | Status                           | Description   |
|-----------|------|-------|----------------------------------|---|
|           | -    | Green | Blinking once every 0.25s (4 Hz) | Alarm. <ul style="list-style-type: none"> <li>The software is being upgraded.</li> <li>After the software is loaded and started, the AP requests to go online if it works in Fit AP or cloud-based management mode. The indicator remains in this state before the AP successfully goes online.</li> <li>The AP works in Fit AP or cloud-based management mode and fails to go online.</li> </ul> |
|           | -    | Red   | Steady on                        | Fault.<br>A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.  |

## Basic Specifications

Table 5-26 Basic specifications

| Item                    | Description               |   |
|-------------------------|---------------------------|---|
| Physical specifications | Dimensions (H x W x D)    | 32.5 mm x 86 mm x 150 mm (1.28 in. x 3.39 in. x 5.91 in.)   |
|                         | Weight                    | 0.25 kg   |
|                         | System memory             | 256 MB DDR3L  |
|                         | FLASH                     | 32 MB NOR FLASH   |
| Power specifications    | Power input               | PoE power supply: <ul style="list-style-type: none"> <li>R251D: in compliance with IEEE 802.3af</li> <li>R251D-E: in compliance with IEEE 802.3at</li> </ul>  |
|                         | Maximum power consumption | <ul style="list-style-type: none"> <li>R251D: 11.5 W</li> <li>R251D-E: 11.5 W (excluding the output power of the USB port and PoE_OUT port)</li> </ul> <b>NOTE</b><br>The actual maximum power consumption depends on local laws and regulations. |

| Item                       |                       | Description   |
|----------------------------|-----------------------|---|
| Environment specifications | Operating temperature | <ul style="list-style-type: none"> <li>-60 m to +1800 m: 0°C to +40°C</li> <li>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m.</li> </ul> |
|                            | Storage temperature   | -40°C to +70°C  |
|                            | Operating humidity    | 5% to 95% (non-condensing)  |
|                            | Atmospheric pressure  | 53 kPa to 106 kPa   |

## Radio Specifications

Table 5-27 Radio specifications

| Item                                  | Description  |
|---------------------------------------|--|
| Antenna type                          | Built-in smart antenna   |
| Antenna gain                          | <ul style="list-style-type: none"> <li>2.4 GHz: 3 dBi</li> <li>5 GHz: 4 dBi</li> </ul> <p><b>NOTE</b><br/>Gain involves the physical gain and SINR enhancement of smart antennas.</p>                              |
| Maximum number of users               | <p>≤ 256</p> <p><b>NOTE</b><br/>The actual number of users varies according to the environment.</p>  |
| Maximum number of VAPs for each radio | 16   |
| Maximum transmit power                | <ul style="list-style-type: none"> <li>2.4 GHz: 23 dBm (combined power)</li> <li>5 GHz: 23 dBm (combined power)</li> </ul> <p><b>NOTE</b><br/>The actual transmit power depends on local laws and regulations.</p> |

| Item                                       | Description  |   |  |
|--|--|---|--|
| Maximum number of non-overlapping channels | 2.4 GHz (2.412 GHz to 2.472 GHz) <ul style="list-style-type: none"> <li>● 802.11b/g                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> <li>- 40 MHz: 1</li> </ul> </li> </ul> | 5 GHz (5.18 GHz to 5.825 GHz) <ul style="list-style-type: none"> <li>● 802.11a                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> </ul> </li> <li>● 802.11ac                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> <li>- 80 MHz: 3</li> </ul> </li> </ul> | <b>NOTE</b><br>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i> . |
| Channel rate                               | <ul style="list-style-type: none"> <li>● 802.11b: 1, 2, 5.5, and 11 Mbit/s</li> <li>● 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li> <li>● 802.11n: 6.5 to 400 Mbit/s</li> <li>● 802.11ac: 6.5 to 867 Mbit/s</li> </ul>   |   |  |

### 5.5.5 Performance Specifications (R251D, R251D-E)

For AP performance specifications, log in to [Huawei official website](#) and download the brochure of the corresponding AP model, or query the specifications using [Info-Finder](#).

## 5.6 R450D Product Description

### 5.6.1 Product Characteristics (R450D)

The R450D is a remote unit (RU) used in Huawei agile distributed Wi-Fi solution. It supports PoE power supply, and is deployed indoors and connected to the central AP. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.

Installing the RU in settled mode does not affect indoor decorations or designs. It also has an IEEE 802.11a/b/g/n/ac/ac Wave 2 wireless module and can work on both 5 GHz and 2.4 GHz frequency bands.

The RU is recommended for environments with complex wall structures and high-density rooms, such as schools, hotels, hospitals, and office meeting rooms. Signals are transmitted through network cables without attenuation. The RUs are deployed indoors and provide comprehensive signal coverage.

The RU is managed by the central AP. The central AP and RUs are plug-and-play and can be managed and maintained in real time. Compared with traditional distributed AP solutions, the AC in Huawei agile distributed Wi-Fi solution needs to manage a smaller number of APs. A large number of RUs can be deployed, which improves the overall performance and reduces network deployment costs.

## Long-Distance Network Coverage

Unlike the traditional distributed AP which allows for a maximum feeder length of 15 m, the central AP uses network cables to replace feeder cables and supports up to 100 m distance from the RUs. The network coverage range is therefore expanded by several times.

## No Wall Penetration Loss, No Coverage Hole

Restricted by feeder length or installation requirements, signals have to pass through walls in some scenarios, resulting in large signal attenuation. If rooms to be covered have complex structures, coverage holes may occur. To prevent these problems, lots of calculation and verification work needs to be carried out. Huawei distributed solution solves these problems. In this solution, RUs are placed in rooms, and signals are transmitted over wired cables, without wall penetration loss, delivering high-quality wireless access services.

## 802.11ac/ac Wave 2 Gigabit Wireless Rate

The RU complies with IEEE 802.11a/b/g/n/ac/ac Wave 2, supports 2x2 MIMO, works on both 2.4 and 5 GHz frequency bands, and provides strong signals and gigabit wireless rate.

## Low Engineering Cost

Compared with traditional distributed APs, the central AP cuts down the following expenses:

- Construction: Network cables replace expensive feeder cables. The central AP can directly use the network cables originally routed in the rooms, without the need of deploying new cables.
- License: The maximum number of central APs in Fit mode allowed by the AC is controlled by licenses, but RUs do not require licenses. Therefore, one central AP can use RUs to cover dozens of rooms.

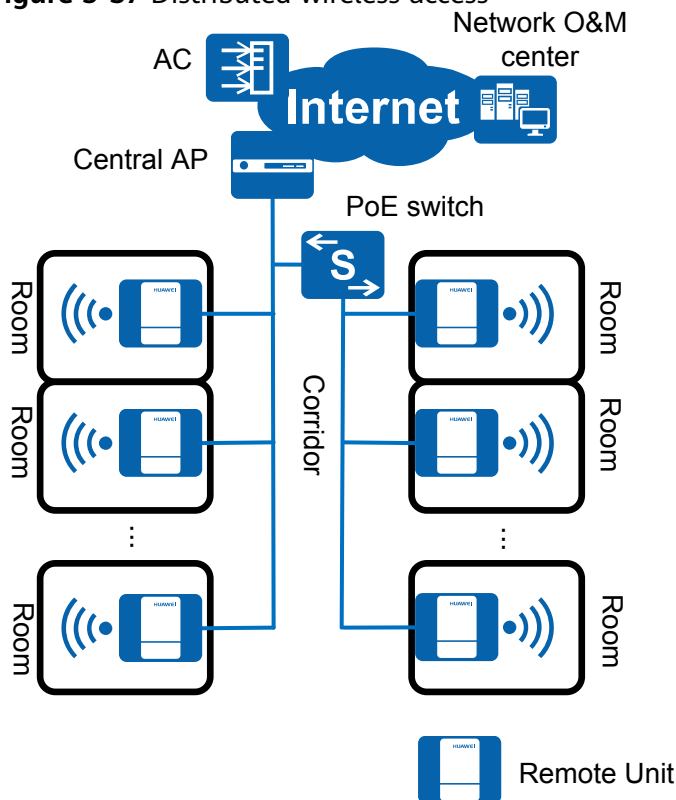
## Hierarchical Processing Technology, High Wireless Forwarding Capability

Huawei distributed solution uses innovative hierarchical processing technology. The central AP manages RUs in a centralized manner and concurrently forwards

service traffic, while the RUs only process radio signals. The hierarchical design makes the network structure clearer and reduces the processing burden on the central AP and RUs, improving efficiency and optimizing the overall wireless forwarding performance.

## 5.6.2 Usage Scenario (R450D)

Figure 5-37 Distributed wireless access



As shown in the figure, the downlink GE interfaces of the central AP support PoE power supply and can be directly connected to RUs. The central AP can connect to more RUs through a PoE switch. RUs are deployed indoors and communicate with the central AP through network cables.

## 5.6.3 Hardware Information (R450D)

### Appearance

**NOTE**

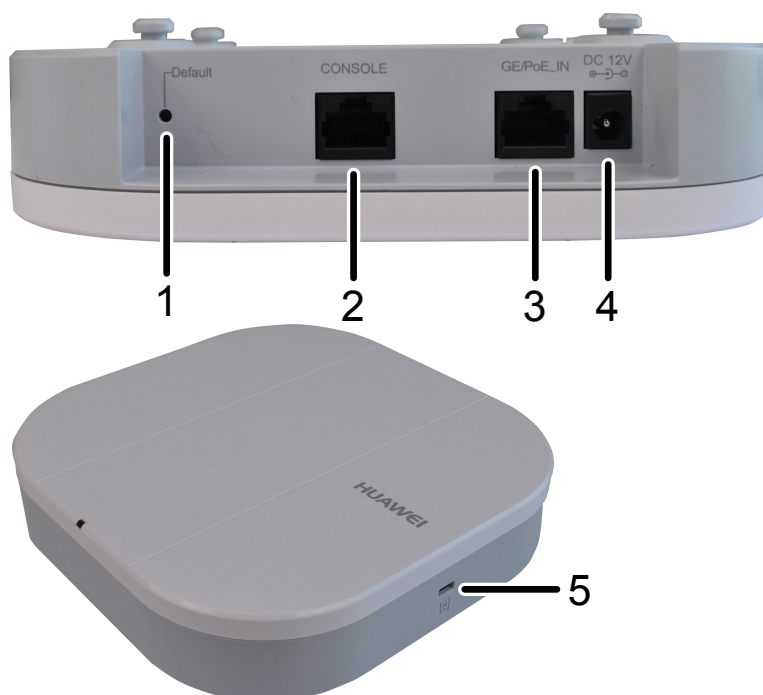
The actual device appearance may slightly differ from the following device appearance, but these differences will not affect device functions.

Figure 5-38 R450D appearance



## Port

Figure 5-39 R450D ports



As shown in [Figure 5-39](#), each port can be described as follows:

1. Default: Restores factory settings and restarts the device when you hold down the button more than 3 seconds.
2. CONSOLE: Connects to a maintenance terminal for AP configuration and management.
3. GE/PoE\_IN:10/100/1000M port that connects to the wired Ethernet and supports PoE input.



- DC 12V: Connects a 12 V power adapter to the AP.

**NOTE**

When the AP uses the DC power supply, use a power adapter for power supply; otherwise, the AP may be damaged.

- Security slot: Connects to a security lock.

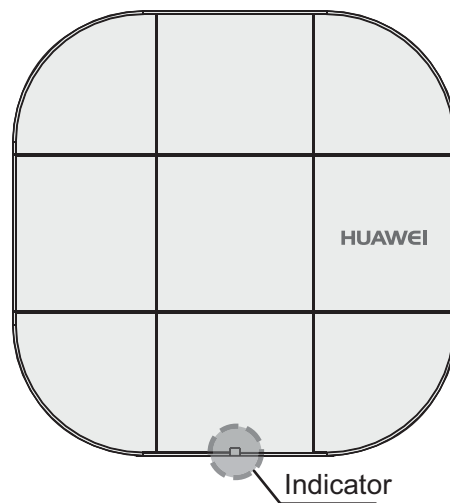
## Indicator

The R450D provides only a single indicator, as shown in [Figure 5-40](#).

**NOTE**

Indicator colors may vary slightly at different temperature.

**Figure 5-40** Indicator



**Table 5-28** Description about the single indicator

| Type      | Name | Color | Status                          | Description   |
|-----------|------|-------|---------------------------------|---|
| Indicator | -    | Green | Steady on                       | Default status after power-on.<br>The AP is just powered on and the software is not started yet.  |
|           | -    | Green | Steady on after blinking once   | Software startup status.<br>After the system is reset and starts uploading the software, the indicator blinks green once. Until the software is uploaded and started, the indicator remains steady green. |
|           | -    | Green | Blinking once every 2s (0.5 Hz) | Running status.<br>The system is running properly, the Ethernet connection is normal, and STAs are associated with the AP.  |

| Type | Name | Color | Status                                       | Description   |
|------|------|-------|--|---|
|      |      |       | Blinking once every 5s (0.2 Hz)              | Running status.<br>The system is running properly, the Ethernet connection is normal, and no STA is associated with the AP. The system is in low power consumption state.   |
|      | -    | Green | Blinking once Alarm Green every 0.25s (4 Hz) | Alarm. <ul style="list-style-type: none"> <li>The software is being upgraded.</li> <li>After the software is uploaded and started, the AP working in Fit AP mode requests to go online on the AC and maintains this state until it goes online successfully on the AC (before the CAPWAP link is established).</li> <li>The AP registration fails (the CAPWAP link is disconnected).</li> </ul> |
|      | -    | Red   | Steady on                                    | Fault.<br>A fault that affects services has occurred, such as a DRAM detection failure or system software loading failure. The fault cannot be automatically rectified and must be rectified manually.  |

## Basic Specifications

Table 5-29 Basic specifications

| Item                    |                        | Description  |
|-------------------------|------------------------|--|
| Physical specifications | Dimensions (H x W x D) | 35 mm × 170 mm × 170 mm  |
|                         | Weight                 | 0.41 kg  |
|                         | System memory          | 256 MB DDR3L   |
|                         | FLASH                  | 64 MB NOR FLASH  |
| Power specifications    | Power input            | <ul style="list-style-type: none"> <li>DC: 12 V ± 10%</li> <li>PoE power supply: in compliance with IEEE 802.3af/at</li> </ul> |

| Item                       |                           | Description   |
|----------------------------|---------------------------|---|
|                            | Maximum power consumption | 12.1 W<br><b>NOTE</b><br>The actual maximum power consumption depends on local laws and regulations.  |
| Environment specifications | Operating temperature     | <ul style="list-style-type: none"> <li>-60 m to +1800 m: -10°C to +50°C</li> <li>1800 m to 5000 m: Temperature decreases by 1°C every time the altitude increases 300 m.</li> </ul> |
|                            | Storage temperature       | -40°C to +70°C  |
|                            | Operating humidity        | 5% to 95% (non-condensing)  |
|                            | IP rating                 | IP41  |
|                            | Atmospheric pressure      | 53 kPa to 106 kPa   |

## Radio Specifications

**Table 5-30** Radio specifications

| Item                                  | Description  |
|---------------------------------------|--|
| Antenna type                          | Built-in dual-band omnidirectional antenna   |
| Antenna gain                          | <ul style="list-style-type: none"> <li>2.4 GHz: 5 dBi</li> <li>5 GHz: 5 dBi</li> </ul>   |
| Maximum number of users               | <p>≤ 256</p> <p><b>NOTE</b><br/>The actual number of users varies according to the environment.</p>  |
| Maximum number of VAPs for each radio | 16   |
| Maximum transmit power                | <ul style="list-style-type: none"> <li>2.4 GHz: 23 dBm (combined power)</li> <li>5 GHz: 23 dBm (combined power)</li> </ul> <p><b>NOTE</b><br/>The actual transmit power depends on local laws and regulations.</p> |

| Item                                       | Description  |   |  |
|--|--|---|--|
| Maximum number of non-overlapping channels | 2.4 GHz (2.412 GHz to 2.472 GHz) <ul style="list-style-type: none"> <li>● 802.11b/g                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 3</li> <li>- 40 MHz: 1</li> </ul> </li> </ul> | 5 GHz (5.18 GHz to 5.825 GHz) <ul style="list-style-type: none"> <li>● 802.11a                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> </ul> </li> <li>● 802.11n                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> </ul> </li> <li>● 802.11ac                             <ul style="list-style-type: none"> <li>- 20 MHz: 13</li> <li>- 40 MHz: 6</li> <li>- 80 MHz: 3</li> </ul> </li> </ul> | <b>NOTE</b><br>The table uses the number of non-overlapping channels supported by China as an example. The number of non-overlapping channels varies in different countries. For details, see the <i>Country Codes &amp; Channels Compliance</i> . |
| Channel rate                               | <ul style="list-style-type: none"> <li>● 802.11b: 1, 2, 5.5, and 11 Mbit/s</li> <li>● 802.11a/g: 6, 9, 12, 18, 24, 36, 48, and 54 Mbit/s</li> <li>● 802.11n: 6.5 to 400 Mbit/s</li> <li>● 802.11ac: 6.5 to 867 Mbit/s</li> </ul>   |   |  |

### 5.6.4 Performance Specifications (R450D)

For AP performance specifications, log in to [Huawei official website](#) and download the brochure of the corresponding AP model, or query the specifications using [Info-Finder](#).