

x`



Huawei

R251D & R251D-E

Remote Units

Datasheet



Product Overview

//

Huawei R251D and R251D-E are gigabit remote units (RUs) in compliance with 802.11ac Wave 2 in Huawei Distribute Wi-Fi Solution. They can be easily installed in a room and are connected to a central AP through Ethernet cables. The central AP manages the RUs for central service forwarding. The RUs process radio signals independently. Such a solution greatly improves the WLAN coverage range and makes AP deployment more flexible. With mounting brackets, RUs can be easily adapted to junction boxes (86/118/120 mm) and wall-mounting scenarios. The R251D and R251D-E boast built-in smart antennas, a hidden indicator, and a "morning dew" style. These highlights make the RUs suitable for environments with densely distributed small rooms, such as hotel guest rooms, student dormitories, hospital wards, and small offices.



Junction box-mounting



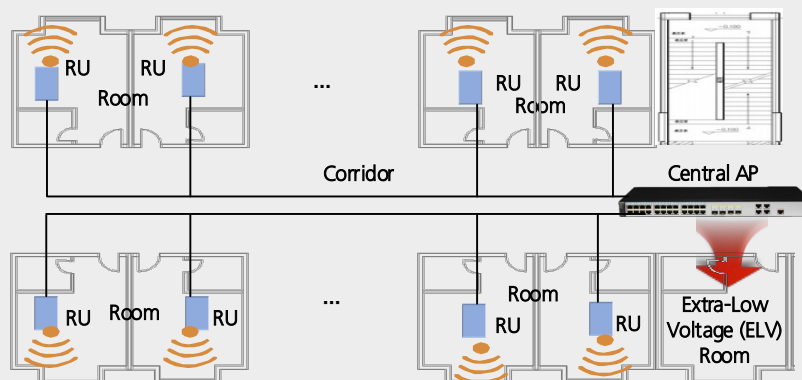
Desk-mounting

R251D & R251D-E

- 802.11ac Wave 2 compliance, MU-MIMO (2SU-2MU), delivering services simultaneously on 2.4G and 5G radios, at a rate of up to 400 Mbit/s at 2.4 GHz, 867 Mbit/s Mbit/s at 5 GHz, and 1.267 Gbit/s for the device.
- One GE uplink port, four GE downlink ports, and two RJ45 pass-through phone ports (compatible with RJ11)
- Built-in dual-polarized high-performance smart antennas, lifting the SINR gain by 3 dBi
- Various installation modes for easy deployment, including ceiling-mounting, wall-mounting, plate-mounting and desk-mounting
- R251D-E: PoE OUT supported by GE4, supplying power for STAs such as IP phones
- R251D-E: USB interface used for extending IoT applications
- R251D-E: Built-in Bluetooth, working with eSight to implement Bluetooth device location

Typical Networking

//



Feature Descriptions..... //

Smart antenna array technology

The R251D and R251D-E integrate smart antenna and implicit beamforming technologies to implement more precise user detection, suppress interference, and improve signal quality, enabling users to have a seamless, smooth wireless network experience.

MU-MIMO

The R251D and R251D-E support technology and can send data to multiple STAs at the same time (currently, most 802.11n/11ac Wave 1 APs can only send data to one STA simultaneously). The technology marks the start of the 802.11ac Wave 2 era.

1-meter Bluetooth location (supported by the R251D-E)

The R251D-E supports built-in Bluetooth. In compliance with BLE4.1, the R251D-E can work with eSight to achieve precise Bluetooth location.

PoE OUT power supply (supported by the R251D-E)

The R251D-E supports PoE OUT and can supply power to STAs such as IP phones (providing that the AP uses 802.3at power supply).

GE access

The RUs support the 80-MHz bandwidth mode. Frequency bandwidth increase brings extended channels and more sub-carriers for data transmission, and a 2.16-fold rate increase. Support for High Quadrature Amplitude Modulation (HQAM) at 256-QAM increases the 5 GHz radio rate to 867 Mbit/s and the AP rate to 1.267 Gbit/s.

Solution Features..... //

Easy to Manage

Remote units (RU) does not occupy AC licenses. The AC only needs to manage central APs, so nearly 10,000 rooms require merely about 200 APs.

Flexible Deployment Modes Ensure Full Signal Coverage Without Coverage Holes

A central AP connects to indoor remote unit (RU) through network cables without wall penetration loss and feeder loss, implementing high-quality signal coverage.

Long-Distance 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 remote unit (RU). The network coverage range is therefore expanded by several times.



Link Disconnection Survival

When the link between the central AP and AC disconnects, the central AP and Remote unit (RU) can maintain the current working states, preventing service interruptions of users and ensuring high-reliability transmission.




Hierarchical Processing Technology, High Wireless Forwarding Capability

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

Basic Specifications**Hardware specifications**

Item	Description	
Technical specifications	Dimensions (H x W x D)	32.5 mm × 150 mm × 86 mm
	Weight	0.25 kg
	Interface type	Uplink: 1 x GE Downlink: 4 x GE 2 x Pass-through RJ45 port 1 x USB port (supported by the R251D-E)
	Built-in Bluetooth	BLE4.1 (supported by the R251D-E)
	LED indicator	Indicates the power-on, startup, running, alarm, and fault status of the system.
Power specifications	Power input	PoE power supply: in compliance with IEEE 802.3af/at
	PoE OUT	Supported by R251D-E: MAX 13.6 W (802.3af-compliant, supported by only GE4)  NOTE A. A 40-meter Cat5e Ethernet cable can be used to supply power to an 802.3af-compliant device. B. The PoE out and USB functions cannot be used simultaneously.
	Maximum power consumption	R251D: 11.5W R251D-E: 11.5W (excluding the output power of the USB port and PoE_OUT port)  NOTE The actual maximum power consumption depends on local laws and regulations.
Environmental specifications	Operating temperature	0°C to 40°C
	Storage temperature	-40°C to +70°C
	Operating humidity	5% to 95% (non-condensing)
	Altitude	-60 m to +5000 m
	Atmospheric pressure	53 kPa to 106 kPa


Hardware specifications



Item	Description	
Antenna type	Built-in dual-band smart antennas	
Gain	2.4G: 3 dB 5G: 4 dB  NOTE Gain involves the physical gain and SINR enhancement of smart antennas.	
Maximum number of SSIDs for each radio	≤ 16	
Maximum number of users	≤ 256  NOTE The actual number of users varies according to the environment.	
Maximum transmit power	2.4G: 23 dBm (combined power) 5G: 23 dBm (combined power)  NOTE The actual transmit power depends on local laws and regulations.	
Power increment	1 dBm	
Radio specifications	Receiver sensitivity	2.4 GHz 802.11b: -99 dBm @ 1 Mbit/s -91 dBm @ 11 Mbit/s
	Receiver sensitivity	2.4 GHz 802.11g: -93 dBm @ 6 Mbit/s -78 dBm @ 54 Mbit/s
	Receiver sensitivity	2.4 GHz 802.11n (HT20): -93 dBm @ MCS0 -72 dBm @ MCS15
	Receiver sensitivity	5 GHz 802.11a: -93 dBm @ 6 Mbit/s -77 dBm @ 54 Mbit/s
	Receiver sensitivity	5 GHz 802.11n (HT20): -92 dBm @ MCS0 -72 dBm @ MCS15
	Receiver sensitivity	5 GHz 802.11n (HT40): -89 dBm @ MCS0 -70 dBm @ MCS15
	Receiver sensitivity	5 GHz 802.11ac (VHT20): -92 dBm @ MCS0NSS1 -71 dBm @ MCS8NSS2
	Receiver sensitivity	5 GHz 802.11ac (VHT40): -90 dBm @ MCS0NSS1 -63 dBm @ MCS9NSS2
	Receiver sensitivity	5 GHz 802.11ac (VHT80): -86 dBm @ MCS0NSS1 -60 dBm @ MCS9NSS2

Softwarespecifications

Item	Description
WLAN features	<p>Compliance with IEEE 802.11a/b/g/n/ac/ac Wave 2</p> <p>Dual bands and a total of four spatial streams, achieving a maximum rate of up to 1.267 Gbit/s</p> <p>Maximum ratio combining (MRC)</p> <p>Space time block code (STBC)</p> <p>Cyclic Delay Diversity (CDD)/Cyclic Shift Diversity (CSD)</p> <p>Beamforming</p> <p>MU-MIMO</p> <p>Low-density parity-check (LDPC)</p> <p>Maximum-likelihood detection (MLD)</p> <p>Frame aggregation, including A-MPDU (Tx/Rx) and A-MSDU (Tx/Rx)</p> <p>802.11 dynamic frequency selection (DFS)</p> <p>Short guard interval (GI) in 20 MHz, 40 MHz, and 80 MHz modes</p> <p>Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding</p> <p>Automatic and manual rate adjustment (default: automatic rate adjustment)</p> <p>WLAN channel management and channel rate adjustment</p> <p>Automatic channel scanning and interference avoidance</p> <p>Service set identifier (SSID) hiding and SSID in Chinese</p> <p>Signal sustain technology (SST)</p> <p>Unscheduled automatic power save delivery (U-APSD)</p> <p>Control and Provisioning of Wireless Remote Units (CAPWAP)</p> <p>Automatic going-online</p> <p>Extended Service Set (ESS)</p> <p>Multi-user CAC</p> <p>Hotspot2.0</p> <p>802.11k and 802.11v smart roaming</p> <p>802.11r fast roaming (≤ 50 ms)</p>

Item	Description
Network features	<ul style="list-style-type: none"> Compliance with IEEE 802.3ab Auto-negotiation of the rate and duplex mode and automatic switchover between the Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDI-X) Compliance with IEEE 802.1q SSID-based VLAN assignment VLAN trunk on uplink Ethernet ports Management channel of the AP uplink port in tagged and untagged mode DHCP client, obtaining IP addresses through DHCP Tunnel data forwarding and direct data forwarding STA isolation in the same VLAN Access control lists (ACLs) Link Layer Discovery Protocol (LLDP) Uninterrupted service forwarding upon CAPWAP channel disconnection in Fit AP mode Unified authentication on the AC in Fit AP mode AC dual-link backup in Fit AP mode Network Address Translation (NAT) in Fat AP mode IPv6 in Fit AP mode Soft Generic Routing Encapsulation (GRE) IPv6 Source Address Validation Improvements (SAVI)
QoS features	<ul style="list-style-type: none"> Priority mapping and packet scheduling based on a Wi-Fi Multimedia (WMM) profile to implement priority-based data processing and forwarding WMM parameter management for each radio WMM power saving Priority mapping for upstream packets and flow-based mapping for downstream packets Queue mapping and scheduling User-based bandwidth limiting Adaptive bandwidth management (automatic bandwidth adjustment based on the user quantity and radio environment) to improve user experience Smart Application Control (SAC) in Fit AP mode Airtime scheduling Support for Microsoft Lync APIs and high voice call quality through Lync API identification and scheduling

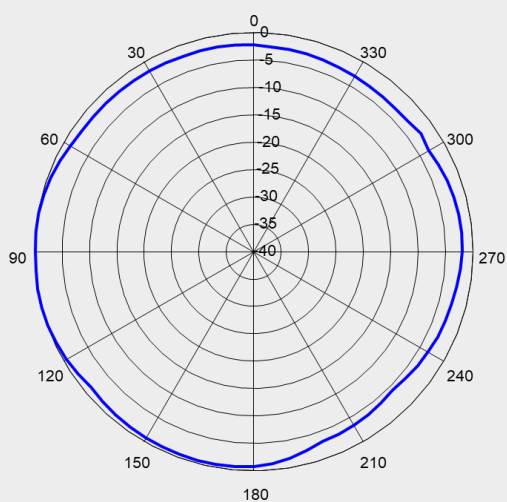
Item	Description
Security features	<p>Open system authentication</p> <p>WEP authentication/encryption using a 64-bit, 128-bit, or 152-bit encryption key</p> <p>WPA/WPA2-PSK authentication and encryption (WPA/WPA2 personal edition)</p> <p>WPA/WPA2-802.1X authentication and encryption (WPA/WPA2 enterprise edition)</p> <p>WPA-WPA2 hybrid authentication</p> <p>WPA/WPA2-PPSK authentication and encryption</p> <p>WAPI authentication and encryption</p> <p>Wireless intrusion detection system (WIDS) and wireless intrusion prevention system (WIPS), including rogue device detection and countermeasure, attack detection and dynamic blacklist, and STA/AP blacklist and whitelist</p> <p>802.1X authentication, MAC address authentication, and Portal authentication</p> <p>DHCP snooping</p> <p>Dynamic ARP Inspection (DAI)</p> <p>IP Source Guard (IPSG)</p> <p>802.11w Protected Management Frames (PMFs)</p> <p>Application identification</p>
Maintenance features	<p>Unified management and maintenance on the AC in Fit AP mode</p> <p>Automatic login and configuration loading, and plug-and-play (PnP) in Fit AP mode</p> <p>Batch upgrade in Fit AP mode</p> <p>Telnet</p> <p>STelnet using SSH v2</p> <p>SFTP using SSH v2</p> <p>Real-time configuration monitoring and fast fault location using the NMS</p> <p>System status alarm</p> <p>Network Time Protocol (NTP) in Fat AP mode</p>
BYOD	<p> NOTE</p> <p>Identifies the device type according to the organizationally unique identifier (OUI) in the MAC address.</p> <p>Identifies the device type according to the user agent (UA) information in an HTTP packet.</p> <p>Identifies the device type according to DHCP options.</p> <p>The RADIUS server delivers packet forwarding, security, and QoS policies according to the device type carried in the RADIUS authentication and accounting packets.</p>

Item	Description
Location service	<p> NOTE</p> <p>Locates tags manufactured by AeroScout or Ekahau.</p> <p>Locates Wi-Fi terminals.</p> <p>Works with eSight to locate rogue devices.</p> <p>R251D-E: Built-in Bluetooth, working with eSight to implement Bluetooth device location</p>
Spectrum analysis	<p> NOTE</p> <p>Identifies interference sources such as baby monitors, Bluetooth devices, digital cordless phones (at 2.4 GHz frequency band only), wireless audio transmitters (at both the 2.4 GHz and 5 GHz frequency bands), wireless game controllers, and microwaves.</p> <p>Works with eSight to perform spectrum analysis on interference sources.</p>

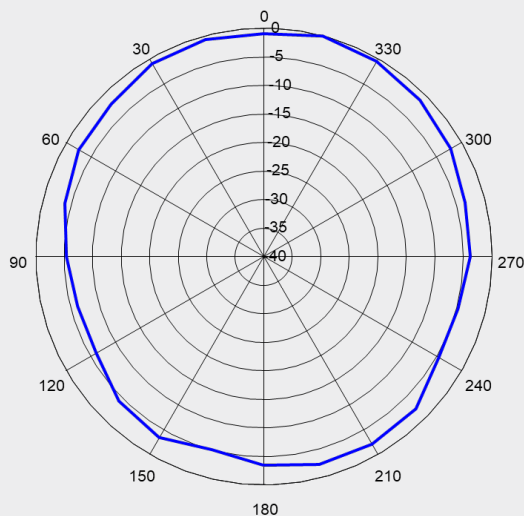
Standards compliance

Item	Description
Safety standards	UL 60950-1 IEC 60950-1 EN 60950-1 GB 4943 IEC 62368-1 EN 62368-1
Radio standards	ETSI EN 300 328 ETSI EN 301 893 RSS-210 AS/NZS 4268
EMC standards	EN 301 489-1 EN 301 489-17 ETSI EN 60601-1-2 ICES-003 YD/T 1312.2-2004 GB 9254 GB 17625.1 EN 55022 EN 55024 IEC6100 k.21 CISPR 22 CISPR 24 IEC61000-4-6 IEC61000-4-2
IEEE standards	IEEE 802.11a/b/g IEEE 802.11n IEEE 802.11ac IEEE 802.11h IEEE 802.11d IEEE 802.11e IEEE 802.11k IEEE 802.11u IEEE 802.11v IEEE 802.11w IEEE 802.11r
Security standards	802.11i, Wi-Fi Protected Access 2(WPA2), WPA 802.1X Advanced Encryption Standards(AES), Temporal Key Integrity Protocol(TKIP) EAP Type(s)
EMF	CENELEC EN 62311 CENELEC EN 50385 RSS-102
RoHS	Directive 2002/95/EC & 2011/65/EU
REACH	Regulation 1907/2006/EC
WEEE	Directive 2002/96/EC & 2012/19/EU

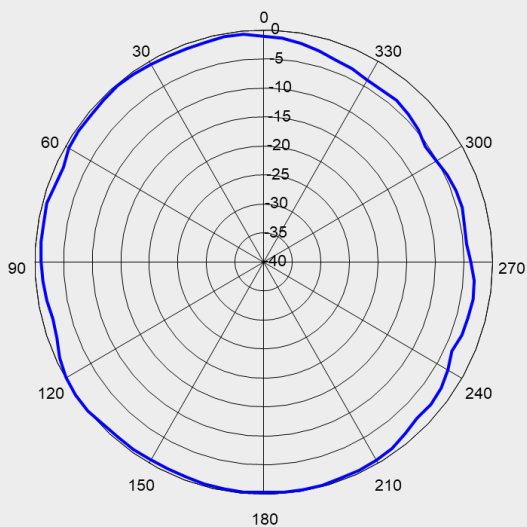
R251D&R251D-E Antennas Pattern



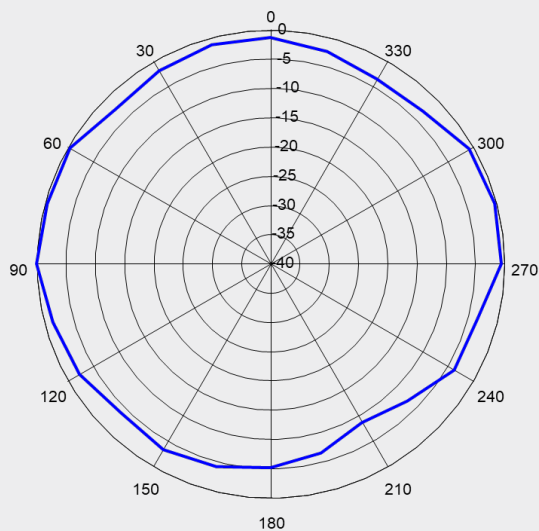
2.4G (PHI=0)



2.4G (PHI=90)



5G (PHI=0)



5G (PHI=90)

Professional Service and Support

Huawei WLAN planning tools deliver expert network design and optimization services using the most professional simulation platform in the industry. Backed by fifteen years of continuous investment in wireless technologies, extensive network planning and optimization experience, and rich expert resources, Huawei helps customers:

- Design, deploy, and operate a high-performance network that is reliable and secure.
- Maximize return on investment and reduce operating expenses.



More Information

For more information, please visit <http://e.huawei.com> or contact your local Huawei office.

Copyright © Huawei Technologies Co., Ltd. 2018. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of Huawei Technologies Co., Ltd.

Trademark Notice

 HUAWEI, and  are trademarks or registered trademarks of Huawei Technologies Co., Ltd. Other trademarks, product, service and company names mentioned are the property of their respective owners.

General Disclaimer

The information in this document may contain predictive statements including, without limitation, statements regarding the future financial and operating results, future product portfolio, new technology, etc. There are a number of factors that could cause actual results and developments to differ materially from those expressed or implied in the predictive statements. Therefore, such information is provided for reference purpose only and constitutes neither an offer nor an acceptance. Huawei may change the information at any time without notice.

HUAWEI TECHNOLOGIES CO.,LTD.
Huawei Industrial Base
Bantian Longgang
Shenzhen 518129,P.R.China
Tel: +86 755 28780808

www.huawei.com