SUNDRAY

NAP-8227(SR) Datasheet

SUNDRAY Wi-Fi 7 Outdoor AP

Product Overview

NAP-8227 (SR), an outdoor wireless access point developed by Sundray, represents the latest generation of high-performance solutions. It supports the Wi-Fi 7 (802.11be) standard with advanced features including 4096-QAM, Multi-Link, and Multi-RU, delivering ultra-fast, reliable, and low-latency connectivity. Featuring a triple RF six-space stream design, it achieves speeds up to 4.437Gbps, meeting the high-performance demands of video conferencing, VR/AR, and 8K video applications. The device also integrates a dedicated AI chip that combines five sensing capabilities: wireless environment awareness, authentication quality monitoring, network quality assessment, service quality evaluation, and edge security detection.

The NAP-8227 (SR) features two independent high-gain antennas—directional and omnidirectional—allowing flexible switching based on actual coverage requirements. It also boasts IP68-rated dust and water resistance, enabling stable operation in temperatures ranging from-40° C to 70° C. This makes it suitable for open environments such as tourist attractions, campuses, venues, and manufacturing facilities.

SUNDRAY NAP-8227(SR)

Product Features

Wi-Fi 7 Features Overview

Wi-Fi 7 (802.11 be), the latest generation of Wi-Fi standards, incorporates advanced features like 4096-QAM, Multi-Link, and Multi-RU. Compared to Wi-Fi 6, it delivers significant improvements in transmission speed and latency.

➢ 4096QAM Modulation Technique

Compared to Wi-Fi 6's 1024-QAM, monotonous modulation carries 10bits of data per symbol. In contrast, 4096-QAM allows each modulation symbol to carry 12bits of data, resulting in a 20% increase in transmission rate.

➢ Multi-Link

Wi-Fi 7 devices can connect to multiple frequency bands of a Wi-Fi 7 access point (e.g., 2.4G+5G or 5G+5G), distributing data across different links for parallel transmission, which significantly boosts concurrent transfer rates.

➢ Multi RU mechanism

The Wi-Fi 6 protocol restricts each terminal to a single Radio Unit (RU) resource, resulting in a monolithic spectrum resource allocation approach. To enhance spectrum utilization efficiency, Wi-Fi 7 enables multiple RU resources to be simultaneously utilized by a single terminal.

➢ Lead code punching technique

When a small segment of a frequency band is interfered, the communication data can skip the interfered frequency band and continue to transmit normally in the allocated remaining frequency band, which improves the anti-interference ability, and thus improves the rate and channel utilization.

Intelligent AI 2.0 Features

➢ Wireless environment Sense

The Smart AP utilizes an independent AI chip to monitor real-time wireless network metrics, including total channel utilization, Wi-Fi channel utilization, non-Wi-Fi channel utilization, and the number of co-channel APs. It automatically optimizes performance based on RF environment quality changes. This system eliminates the need for temporary service RF switching for environmental data collection, ensuring uninterrupted wireless access for regular

users throughout the process.

- **Authentication quality Sense**

  The Intelligent Access Point (IAP) monitors the authentication process through simulated terminal access, providing round-the-clock awareness of authentication service status. It detects authentication experience issues in advance and addresses risks promptly. This helps prevent widespread network access anomalies and ensures smoother user connectivity.

- **Network quality sense**

  The Intelligent AP automatically monitors wireless network quality, including latency and performance metrics across network access, DHCP, gateway, DNS, and IP address resolution phases. It displays real-time monitoring data on a timeline, performs 24/7 periodic checks, and promptly alerts maintenance teams with troubleshooting recommendations. This system prevents widespread network access anomalies while ensuring continuous network health.

- **Service quality sense**

  The Intelligent AP system predicts service quality risks by simulating terminal access and analyzing user traffic. It enables early detection of service degradation risks, rapid identification of root causes, and significantly enhances the network experience for every user. This transforms passive, device-centric maintenance into proactive, service-oriented operations, ensuring smoother business performance for users.

- **Edge security sense**

  The Intelligent AP features 24/7, 360° wireless security monitoring. Powered by an independent AI chip, it counters unauthorized access points via WIPS technology without additional costs, providing real-time monitoring, alerts, and countermeasures while maintaining seamless network access. It also supports east-west traffic security with role-based blocking, enabling precise traffic control in wired-wireless environments to ensure continuous protection of internal network data.

Superior outdoor adaptability

- **High defense, effortlessly withstand harsh environments**

  The NAP-8227 (SR) features an IP68-rated enclosure with full enclosure waterproofing,

moisture-proofing, dust-proofing, fireproofing, and sun protection, ensuring reliable operation even in extreme outdoor conditions and effectively shielding against adverse weather and environmental impacts.

- **Professional lightning protection design**

  The NAP-8227 (SR) features professional lightning protection with an onboard antenna feeder surge protector, effectively safeguarding AP devices during severe thunderstorms.

- **Standard working temperature**

  The NAP-8227 (SR) product maintains stable operation across temperatures from-40°C to 70°C, ensuring reliable performance and extended lifespan in both extreme northern cold and southern tropical humidity conditions.

Ultra-fast wireless internet experience

- **Terabit uplink**

  The uplink utilizes 10-gigabit optical ports, ensuring high-speed wireless transmission while resolving the issue of network cable transmission being impossible due to excessive deployment distance.

- **2-3 layer seamless roaming**

  The controller enables seamless and imperceptible roaming between the second and third layers, maintaining the wireless user's IP address and authentication status during roaming. It also provides anti-terminal stickiness functionality, intelligently guiding the STA to connect to the optimal AP to enhance roaming speed.

- **Time fairness algorithm, ensuring high-speed Internet experience for all users**

  To prevent low-speed devices from slowing down the overall network experience, Sundray employs a time fairness algorithm that ensures terminals with different negotiated speeds share equal wireless channel time. This effectively resolves scenarios where excessively slow access speeds cause wireless network congestion, significant latency, and poor user experience.

- **Smart load balancing**

  In high-density wireless environments, the controller employs intelligent load balancing based

on user count, traffic, and frequency bands to optimize bandwidth utilization and ensure high-speed wireless connectivity. Frequency-based load balancing prioritizes 5GHz band access for dual-band (2.4G/5G) devices.

- **Smart RF, comprehensively reducing wireless interference**

  The system automatically adjusts the working channel and transmission power of the wireless access point, and performs real-time detection of surrounding environmental interference, thereby comprehensively reducing wireless interference and improving the overall service quality of the wireless network.

Comprehensive security protection

- **Multiple easy-to-use and secure authentication methods**

  It provides multiple flexible, user-friendly, and secure authentication methods, including 802.1x, CA certificates, Portal, SMS, QR code authorization, and survey questionnaires, all integrated with controllers to meet the security requirements for network deployment in environments such as scenic areas, enterprises, schools, and shopping malls.

- **Comprehensive Wireless Security Protection and System Reliability**

  The access point (AP) integrates with the controller to deliver comprehensive wireless security features, including WIDS/WIPS (Wireless Intrusion Detection/Wireless Intrusion Prevention), ARP spoofing protection, DOS attack defense, and east-west traffic security. These measures establish a truly secure and reliable wireless network for users. Furthermore, the controller's disaster recovery mechanism ensures that when the AP cannot connect to the controller or the user authentication server enters disaster recovery mode, the network automatically switches to an emergency wireless network, emergency VLAN, and predefined roles.

- **RF timing is disabled to protect network security and ensure environmental protection**

  The system supports time-based radio frequency (RF) activation and deactivation. It automatically turns off the wireless network during nighttime or weekends, preventing unauthorized access by malicious actors and reducing device energy consumption.

Flexible network deployment

- **Flexible on-demand switching of antenna arrays**

The NAP-8227 (SR) features two independent high-gain antennas: one directional and one omnidirectional, enabling flexible switching based on coverage requirements. For instance, directional antennas can provide long-range coverage for scenic area walkways, while omnidirectional antennas ensure full-range coverage for open-air venues.

- **Gateway function, remote deployment across public networks**

The system supports NAT gateway functionality, DHCP server, and DNS proxy capabilities. When deploying wireless networks remotely, branch offices can connect directly to the internet through three methods provided by the access point (AP): PPPoE dial-up, fixed IP, or DHCP, thereby reducing network deployment costs.

- **Fat and lean integration**

The AP supports both fat and thin operation modes, enabling flexible switching based on network requirements. During initial deployment without a controller, the AP operates in fat mode, allowing independent network formation. When the AP scales up and a controller is deployed, it switches to thin mode for centralized management, enabling comprehensive network control, security authentication, traffic management, behavior control, and audit functions.

- **Local forwarding application recognition**

NAP-8227 (SR) employs local forwarding technology to directly route high-traffic, latency-sensitive, and large-volume data over wired networks without controller intervention. This significantly reduces controller traffic pressure and overcomes its bandwidth limitations. Additionally, Sundray's proprietary technology enables application recognition for local forwarding.

- **Virtual access point technology**

The Virtual AP technology supports up to 32 ESSIDs, each with distinct authentication protocols and access permissions. These isolated SSIDs ensure secure data transmission by providing Layer 2 isolation for either the same subnet or a VLAN under the same SSID.

- **The Chinese language SSID**

Supports Chinese SSIDs, allowing you to specify SSIDs up to 31 characters long or use mixed Chinese-English SSIDs. This provides customized SSIDs for construction units to enhance recognition.

Technical Specifications

Hardware specifications

Sundray NAP-8227(SR) Panel Wireless Access Point Product Specifications	
Hardware specifications	
Model	NAP-8227(SR)
Size	242*242*74mm
Service port	1*10G optical port, 1*2.5G electrical port
Power supply mode	802.3at/bt POE
Transmitting power	2.4G：27dBm 5.2G：23dBm 5.8G：33dBm
Adjustable power granularity	1dBm
Adjustable power range	1dBm~corresponding to national regulations
Power dissipation	≤18W
Weight	2.36Kg
Antenna	Equipped with two independent high-gain antennas for directional and omnidirectional operation, enabling flexible switching
Reset/Restore factory settings	Support
PDA	Bluetooth 5.0
Status indicator	1*status
Working/storage temperature	-40℃ ~ 70℃
Working/Storage Humidity	5% to 95% (non-condensed)
Levels of protection	IP 68
MTBF	>250000H

Software specifications

Software specifications		
Radio frequency	Space Streams	2+2+2
	Maximum transmission rate per frequency	Three RF designs, with AI RF supporting 2.4G/5G band switching Radio1：2.4G：2*2 MIMO 688Mbit/s Radio2：5G：2*2 MIMO 2882Mbit/s Radio3：2.4G/5G：2*2 MIMO 867Mbit/s
	Operating frequency band	802.11be/ax/ac/n/a: 5.725GHz-5.850GHz; 5.15~5.35GHz (China) 802.11be/ax/b/g/n: 2.4GHz-2.483GHz (China)
	Modulation	OFDM: BPSK@6/9Mbps、QPSK@12/18Mbps、16-QAM@24Mbps、64-QAM@48/54Mbps DSSS : DBPSK@1Mbps、DQPSK@2Mbps、CCK@5.5/11Mbps MIMO-OFDM : MCS 0-15 MIMO-OFDM （11ac）: MCS 0-9 MIMO-OFDMA（11ax）： MCS 0-11 MIMO-OFDMA（11be）： MCS 0-13

	Modulation mode	11b：DSS:CCK@5.5/11Mbps,DQPSK@2Mbps,DBPSK@1Mbps 11a/g:OFDM:64QAM@48/54Mbps,16QAM@24Mbps,QPSK@12/18Mbps,BPSK@6/9Mbps 11n：MIMO-OFDM:BPSK,QPSK,16QAM,64QAM 11ac：MIMO-OFDM:BPSK,QPSK,16QAM,64QAM,256QAM 11ax：MIMO-OFDMA:BPSK,QPSK,16QAM,64QAM,256QAM, 1024QAM 11be：MIMO-OFDMA:BPSK,QPSK,16QAM,64QAM,256QAM, 1024QAM, 4096QAM
	Number of supported channels	802.11a,802.11n,802.11ac, 802.11ax (compatible with 802.11a mode): 13 channels 802.11b,802.11g,802.11n,802.11ax, and 802.11be (compatible with 802.11b/g mode): 13 channels
	Auto/manual channel adjustment	support
	Automatic and manual power adjustment	Supports manual power adjustment for APs, with granularity of 1dBm and an adjustment range of 1 dBm to the national power limit.
	Turn RF timing on or off	Supports enabling or disabling RF based on time periods
	Detection and Compensation of Black Hole Occlusion	support
WLAN Basic features	Maximum number of connected users	512
	Access user limit	Supports and allows access user limits based on SSID
	SSID	32
	Authentication type	WPA/WPA2 (Enterprise), WPA2/WPA3 (Enterprise), WPA/WPA2 (Personal), WPA2/WPA3 (Enterprise), WPA3 (Enterprise)
	The Chinese language SSID	support
	SSID hide	support
	Load balancing	Supports intelligent load balancing based on users, traffic, and frequency bands
	Bandwidth limit	Supports speed limiting based on STA/SSID/AP
	STA be interrelated	Supports STA offline detection under abnormal conditions, STA aging, and STA-based statistics and status queries.
	WIDS/WIPS	support
	ACL policy distribution	Supports access control policy management based on user account, access location, access device type, and SSID
	link integrity check	support
Data forwarding	Data forwarding	In conjunction with the controller, execute the data forwarding configuration issued by the controller
Secure communication	User isolation	Supports isolation between SSIDs, automatic VLAN grouping, and user isolation under specified VLANs
	Data encryption	Supports TKIP and AES (CCMP)
	tunnel encryption	support
	Other communications security	Combine with the controller to execute the configuration file issued by the controller
Authentication function	Authentication feature	Combine with the controller to implement all supported authentication methods
Wireless optimization	Multicast scenario optimization	Enhance multicast packet speed to significantly improve performance in scenarios like e-schoolbags.
	Smart Radio Speeds Up	Automatically increase the broadcast packet transmission speed based on the actual environment to improve efficiency.
	Average bandwidth allocation among users	support

	Anti terminal drag	Supports ensuring experience by restricting low-speed terminal access or using time fairness algorithms
	Low-speed terminal access is prohibited	Set a speed threshold for connected devices, blocking weak signal devices below a specified speed to improve overall network performance.
	High-density access scenario	Supports broadcast Probe request and response control for high-density access scenarios
	ARP unicast	Convert ARP broadcast packets to unicast, reduce broadcast packets, and improve transmission speed
	Block DHCP requests to wireless devices	When this option is enabled, DHCP broadcast requests are forwarded only to wired networks and not to other wireless networks, which improves overall wireless network throughput and performance.
AP access method	Fat and lean integration	support
	AC discovery mechanism	Sundray Cloud Discovery, DNS Domain Discovery, Layer 2 Broadcast Auto-Discovery, Layer 3 Discovery with Static IP Configuration, DHCP Option43 Discovery, SDP Protocol Discovery
	Remote deployment access point	Supports WAN and NAT deployment for remote access points
	WebAgent	Supports dynamically locating controller IP addresses via webAgent technology to prevent access point loss due to unstable controller IP addresses.
Layer 3 function	NAT	support
	Internet access method	Supports three internet access methods: PPPoE dial-up, static IP, and DHCP.
	DHCP server	support
	DNS agent	support

Order Information

Model	Specifications	Remarks
SUNDRAY NAP-8227(SR)		
NAP-8227(SR)	Sundray Wi-Fi 7 outdoor wireless access point, supporting cutting-edge technologies including 4096QAM, Multi-RU, and Multi-Link. Featuring a triple RF six-space stream design, it delivers wireless speeds up to 4.437Gbps with 10G optical or 2.5G electrical uplink ports. Equipped with high-gain directional and omnidirectional antennas for flexible coverage scenario switching, it incorporates an independent AI chip . With IP68-rated dust and water resistance, it excels in outdoor harsh environments.	Essential
GO545-PSE1000	802.3at 30W gigabit PoE injector, suitable for all Sundray AP that support POE except S900plus.	Optional
RS3320-28M-PWR-LI	The SUNDRAY V-Sec Switch, provides 28 ports (24 10/100/1000Base-T POE ports, 4 SFP optical ports). Support IEEE 802.3af/at power supply standard, single port maximum output PoE power 30W, the whole machine maximum output PoE power 370W, switching capacity 336Gbps/3.36Tbps, Forwarding rate 108Mpps/126Mpps. The Switch can be used in fit or fat mode (standalone mode) flexibly. In fit mode, it can be managed by NAC controller to provide a unified wired and wireless network. All the features can be configured by NAC controller such as VLAN, STP, Static Routing/RIP/OSPF, M-LAG, East-West traffic security, Smart Network Topology, Visualized DHCP server, Terminal Identification, 802.1X/Portal authentication, IPv6, POE supply schedule. etc., to make the network simpler, more secure, and valuable.	Optional

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