MINISTERO DELL'ISTRUZIONE DELL'UNIVERSITA' E DELLA RICERCA
ISTITUTO COMPRENSIVO DI TIRANO - (SO)
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C.F. 92024630144 – Cod. Meccanografico SOIC81800G

Al sito web

Agli ATTI
All'albo on line
All'Amministrazione Trasparente

Prot. n. 7020 del 28.06.2022

OGGETTO: Progetto: Programma Operativo Nazionale "Per la scuola, competenze e ambienti per l'apprendimento" 2014-2020 - Fondo europeo di sviluppo regionale (FESR) – REACT EU Asse V – Priorità d'investimento: 13i – (FESR) "Promuovere il superamento degli effetti della crisi nel contesto della pandemia di COVID-19 e delle sue conseguenze sociali e preparare una ripresa verde, digitale e resiliente dell'economia" – Obiettivo specifico 13.1: Facilitare una ripresa verde, digitale e resiliente dell'economia - Azione 13.1.1 "**Cablaggio strutturato e sicuro all'interno degli edifici scolastici**"

CODICE IDENTIFICATIVO PROGETTO 13.1.1A-FESRPON-LO-2021-135

CUP J39J21007070006

CIG 9112570AA5

OGGETTO: VERBALE DEL COLLAUDATORE PER MODIFICA COMPONENTI CAPITOLATO DELL'OFFERTA PON RETI CABLATE PER INDISPONIBILITA' SUL MERCATO DEI MODELLI INDICATI DI ACCESS-POINT E FIREWALL.

Il sottoscritto Prof. Alessio Della Vedova, in qualità di collaudatore del Pon Reti Cablate, giusta nomina prot. n. 3474 del 22.03.2022 presso la sede dell'Istituto Comprensivo di Tirano, con sede in via Pedrotti, n. 17 – 23037 Tirano (SO), facendo seguito alla richiesta prot. n. 6130 del 07.06.2022 della Società Isi -it S.r.l di procedere alla modifica di alcuni componenti presenti nel capitolato tecnico dell'offerta della trattiva diretta n. 207921a causa della indisponibilità sul mercato, per l'attuale crisi

dell'approvigionamento delle materie prime, di due modelli di dispositivi occorrenti (gli Access-pont ed i Firewall),

ESPRIME PARERE POSITIVO

Alla sostituzione degli articoli previsti nel Capitolato tecnico con due modelli alternativi che possono garantire il medesimo risultato, con identiche garanzie di funzionalità e durata rispetto ai modelli precedenti, secondo specifiche del progetto e del capitolato approvato e senza alcun onere aggiuntivo da parte di questa Istituzione Scolastica.

Pertanto verranno utilizzati per completare i lavori che saranno posticipati e protratti rispetto alla data originaria fino al 31 agosto 2022:

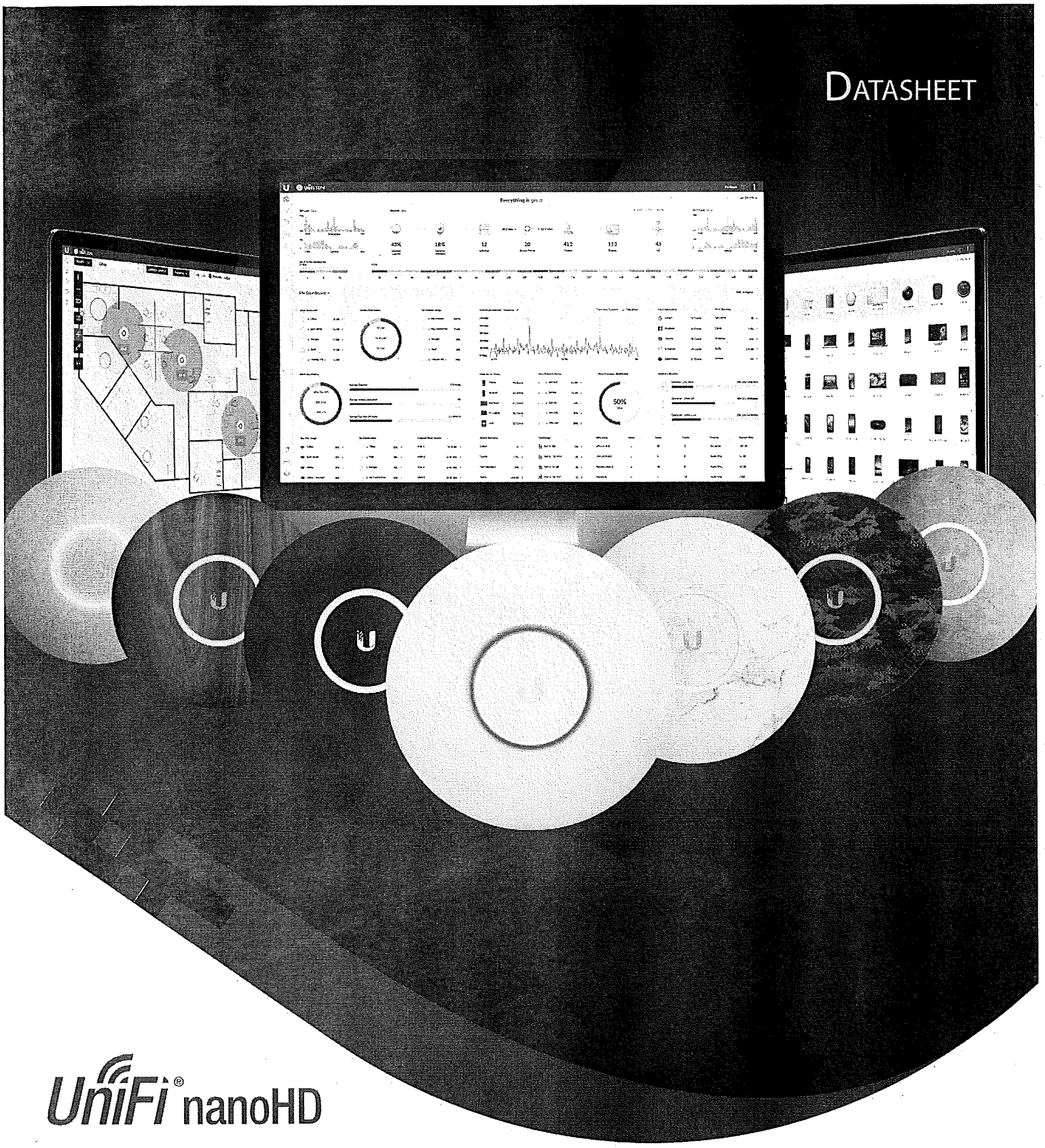
- FIREWALL: Firewall Miktorik RB3011 al posto di Firewall Miktorik RB4011
- ACCESS POINT: UNIFI NANO HD AP DS al posto di UNIFI ACCESS POINT AC PRO EU

Si allegano le schede dei nuovi prodotti.

Tirano, 28 giugno 2022

In Fede Il Collaudatore Prof. Alessio della Vedova

DATASHEET



UniFi® nanoHD

4x4 MU-MIMO 802.11ac Wave 2 Access Point

Model: UAP-nanoHD

Four-Stream 802.11ac Wave 2 Technology

Supports 200+ Concurrent Users

802.3af PoE Compatibility

UBIQUITI®
NETWORKS

UniFi®

Scalable Enterprise Wi-Fi Management

UniFi® is the revolutionary Wi-Fi system that combines enterprise performance, unlimited scalability, and a central management controller. The UniFi nanoHD AP has a refined industrial design and can be easily installed using the included mounting hardware.

Easily accessible through any standard web browser and the UniFi app (iOS or Android™), the UniFi Controller software is a powerful software engine ideal for high-density client deployments requiring low latency and high uptime performance.

Use the UniFi Controller software to quickly configure and administer an enterprise Wi-Fi network – no special training required. RF map and performance features, real-time status, automatic UAP device detection, and advanced security options are all seamlessly integrated.

Features

Save Money and Save Time UniFi comes bundled with a non-dedicated software controller that can be deployed on an on-site PC, Mac, or Linux machine; in a private cloud; or using a public cloud service. You also have the option of deploying the compact UniFi Cloud Key with built-in software.

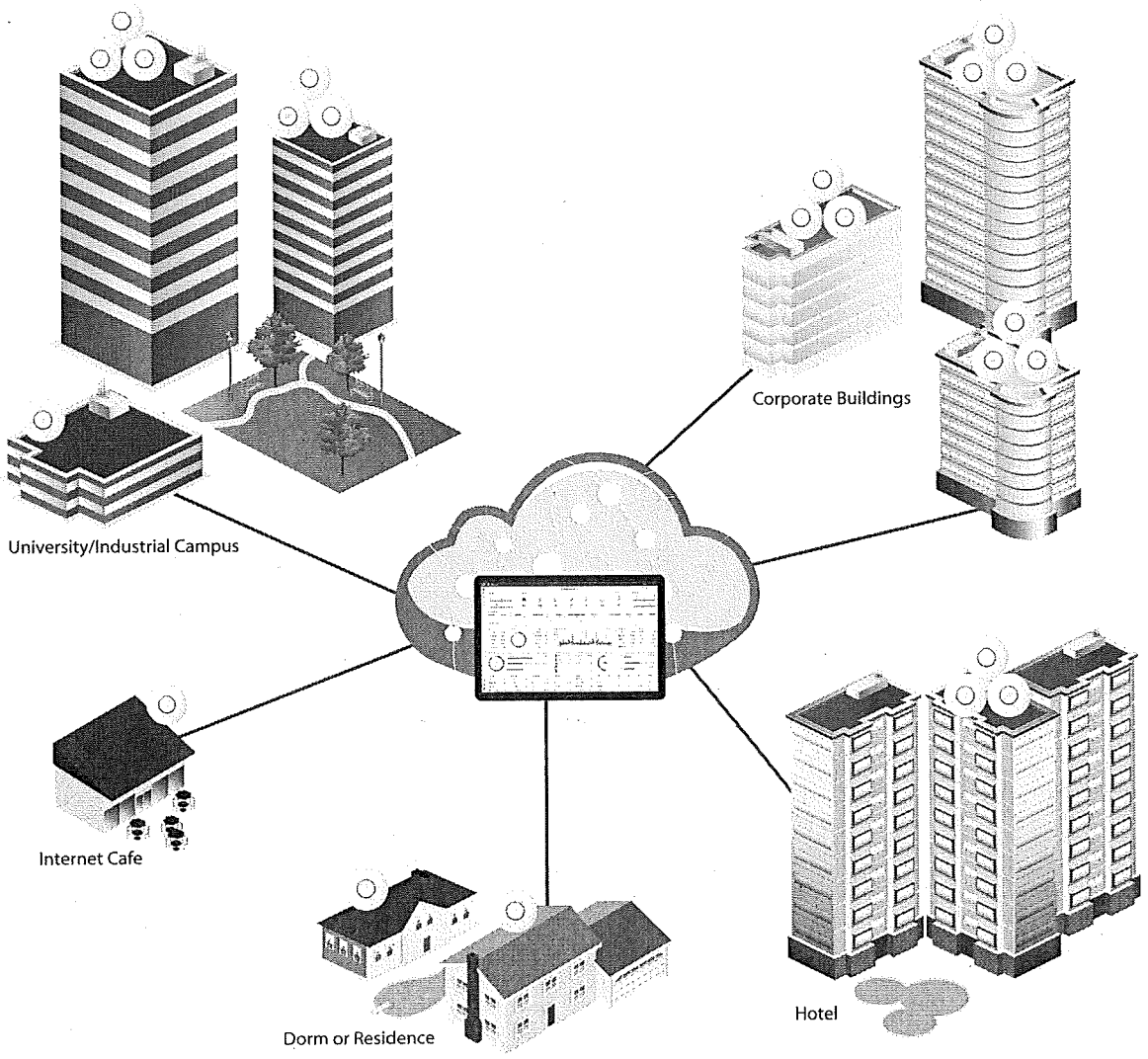
Powerful Hardware The UniFi nanoHD AP features the latest in Wi-Fi 802.11ac Wave 2 MU-MIMO technology.

Intuitive UniFi Controller Software Configure and manage your APs with the easy-to-learn user interface.

Expandable Unlimited scalability: build wireless networks as big or small as needed. Start with one (or upgrade to a five-pack) and expand to thousands while maintaining a single unified management system.

Extend Your Coverage

With the UniFi Controller software running in a NOC or in the cloud, administrators can manage multiple sites: multiple, distributed deployments and multi-tenancy for managed service providers. Below are some deployment examples.



UniFi Controller

Packed with Features

Use the UniFi Controller to provision thousands of UniFi APs, map out networks, quickly manage system traffic, and provision additional UniFi APs.

View Your RF Environment

Use the RF environment functionality of the UniFi nanoHD AP to detect and troubleshoot nearby interference, analyze radio frequencies, choose optimal AP placement, and configure settings.

Powerful RF Performance Features

Advanced RF performance and configuration features include spectral analysis, airtime fairness, and band steering.

Detailed Analytics

Use the configurable reporting and analytics to manage large user populations and expedite troubleshooting.

Wireless Uplink

Wireless Uplink functionality enables wireless connectivity between APs for extended range. One wired UniFi AP uplink supports up to four wireless downlinks on a single operating band, allowing wireless adoption of devices in their default state and real-time changes to network topology.

Guest Portal/Hotspot Support

Easy customization and options for Guest Portals include authentication, Hotspot setup, and the ability to use your own external portal server. Use UniFi's rate limiting for your Guest Portal/Hotspot package offerings. Apply different bandwidth rates (download/upload), limit total data usage, and limit duration of use.

All UniFi APs include Hotspot functionality:

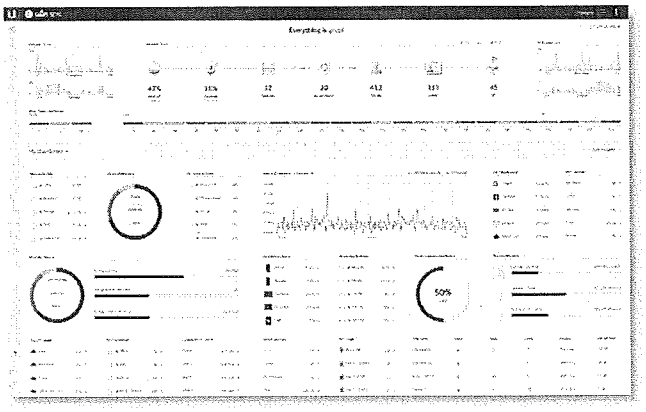
- Built-in support for billing integration using major credit cards.
- Built-in support for voucher-based authentication.
- Built-in Hotspot Manager for voucher creation, guest management, and payment refunds.
- Full customization and branding of Hotspot portal pages.

Multi-Site Management

A single UniFi Controller running in the cloud can manage multiple sites: multiple, distributed deployments and multi-tenancy for managed service providers. Each site is logically separated and has its own configuration, maps, statistics, guest portal, and administrator read/write and read-only accounts.

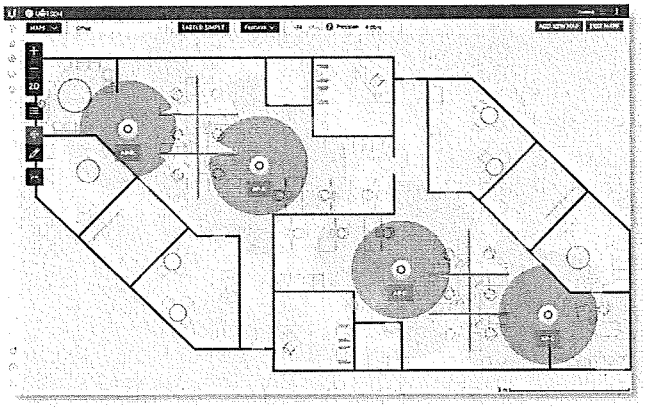
WLAN Groups

The UniFi Controller can manage flexible configurations of large deployments. Create multiple WLAN groups and assign them to an AP's radio. Each WLAN can be VLAN tagged. Dynamic VLAN tagging per Wi-Fi station (or RADIUS VLAN) is also supported.



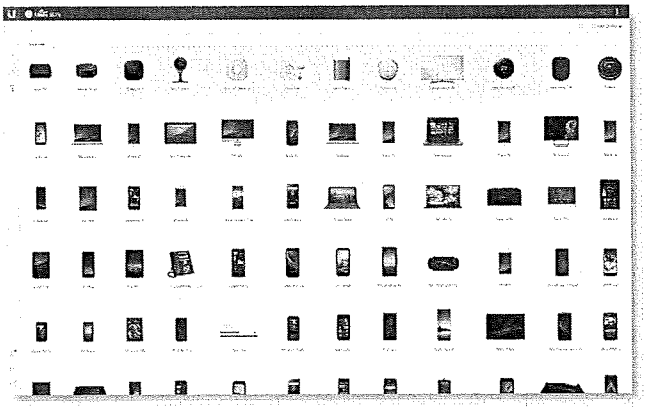
Dashboard

UniFi provides a visual representation of your network's status and delivers basic information about each network segment.



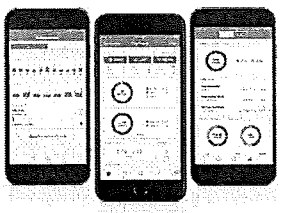
RF Map

Monitor UniFi APs and analyze the surrounding RF environment.



Insights

UniFi displays the client types for a specific time period.



UniFi App

Manage your UniFi devices from your smartphone or tablet.

802.11ac Technology

Initial 802.11ac Wave 1 SU-MIMO (Single-User, Multiple Input, Multiple Output) technology allows an earlier-generation AP, such as the UniFi AC Pro AP, to communicate with only one client at a time.

802.11ac Wave 2 MU-MIMO (Multi-User, Multiple Input, Multiple Output) technology allows a Wave 2 AP, such as the UniFi nanoHD AP, to communicate with multiple clients at the same time – significantly increasing multi-user throughput and overall user experience.

The following describes a 5-client scenario:

MU-MIMO Assuming the same conditions, a Wave 2 AP provides up to 75% improvement[1] overall over a Wave 1 AP. This improvement increases wireless performance and/or serves more clients at the same performance level.

4x4 Spatial Streams At any single time, a Wave 2 AP can communicate with the following MU-MIMO clients:

- four 1x1 clients
- two 2x2 clients
- one 2x2 client and two 1x1 clients
- one 3x3 client and one 1x1 client

A 4x4 Wave 2 AP delivers up to 33% greater performance[1] than a Wave 1 AP that is 3x3 in both radio bands.

Real-World Performance The UniFi nanoHD AP is the UniFi 802.11ac Wave 2 AP with the smallest form factor. Combining the performance increases from MU-MIMO technology and the use of 4x4 spatial streams, the UniFi nanoHD AP delivers up to 125% greater performance[1] than a typical Wave 1 AP.

Client Compatibility For optimal performance, use MU-MIMO clients. SU-MIMO clients will also benefit and gain up to 10-20% greater performance when used with the UniFi nanoHD AP.

[1] Actual performance values may vary depending on environmental and installation conditions.

High-Density Scenarios

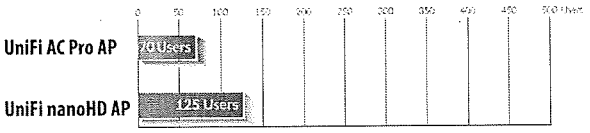
For high-density environments, such as a theater where there are numerous clients in a relatively small space, we recommend the UniFi nanoHD AP when a minimal footprint is also required.

Both Wave 1 and Wave 2 APs offer 28 independent (non-overlapping) channels: three for the 2.4 GHz band and twenty-five for the 5 GHz band, including DFS channels.

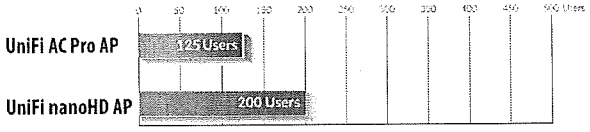
When you use the 2.4 GHz band in a high-density location, you encounter self-interference and channel saturation. When you use the 5 GHz band, you can deploy smaller cells (coverage areas), so you can support more clients in any cell that deploys more than one AP.

With the advantages of MU-MIMO technology and 4x4 spatial streams, the UniFi nanoHD AP can support more than triple the number of users[2] than a typical Wave 1 AP.

Recommended Maximum Number of Users



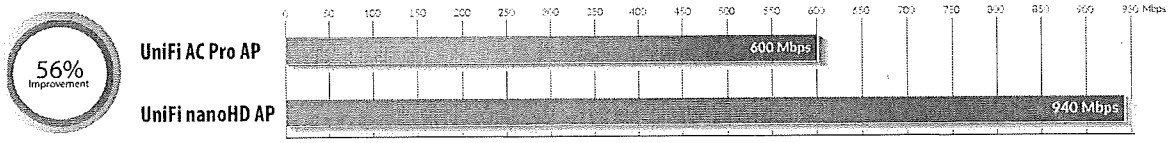
Theoretical Maximum Number of Users



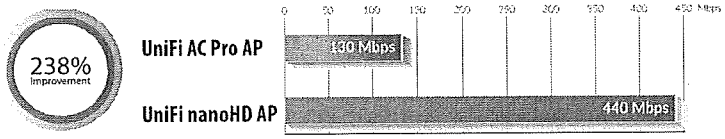
For more information, go to:
ubnt.link/UniFi-UAPs-High-Density

[2] Actual numbers may vary depending on environmental and installation conditions.

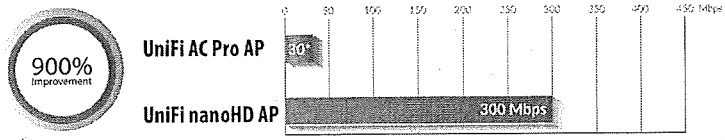
Single-Client Aggregate Throughput



10-Client Aggregate Throughput



100-Client Aggregate Throughput



** Mbps*

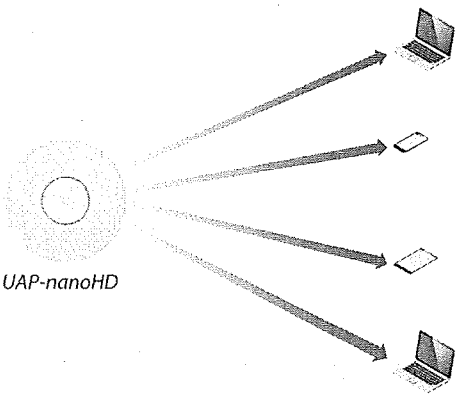
Client Support

802.11ac Wave 1 SU-MIMO

UAP-AC-PRO

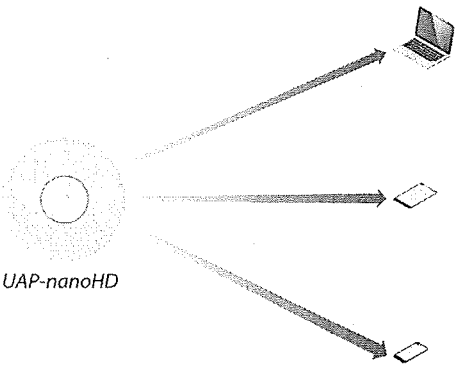
SU-MIMO: A Wave 1 AP communicates with one client at a time.

802.11ac Wave 2 MU-MIMO



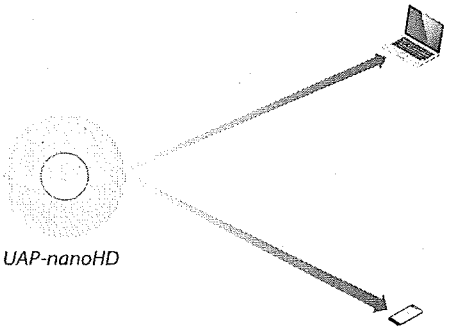
UAP-nanoHD

MU-MIMO with 1x1 clients: Each client radio of the UniFi nanoHD AP communicates with four 1x1 clients at a time.



UAP-nanoHD

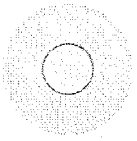
MU-MIMO with 2x2 and 1x1 clients: Each client radio of the UniFi nanoHD AP communicates with one 2x2 client and two 1x1 clients at a time.



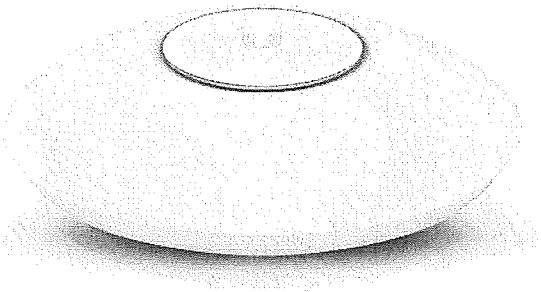
UAP-nanoHD

MU-MIMO with 3x3 and 1x1 clients: Each client radio of the UniFi nanoHD AP communicates with one 3x3 client and one 1x1 client at a time.

Model Summary



	UAP-nanoHD
Environment	Indoor
Simultaneous Dual-Band	✓
2.4 GHz Radio Rate	300 Mbps
2.4 GHz MIMO	2x2
5 GHz Radio Rate	1733 Mbps
5 GHz MIMO	4x4
PoE Mode	802.3af PoE
Ceiling Mount	✓
Wall Mount	✓
Wireless Uplink	✓
DFS Certification	✓



Hardware Overview

Deploy the UniFi nanoHD AP in high-density environments requiring maximum wireless performance and minimal footprint. The UniFi nanoHD AP features simultaneous, dual-band, 4x4 MU-MIMO technology and convenient 802.3af PoE compatibility. Available in single- and five-packs.

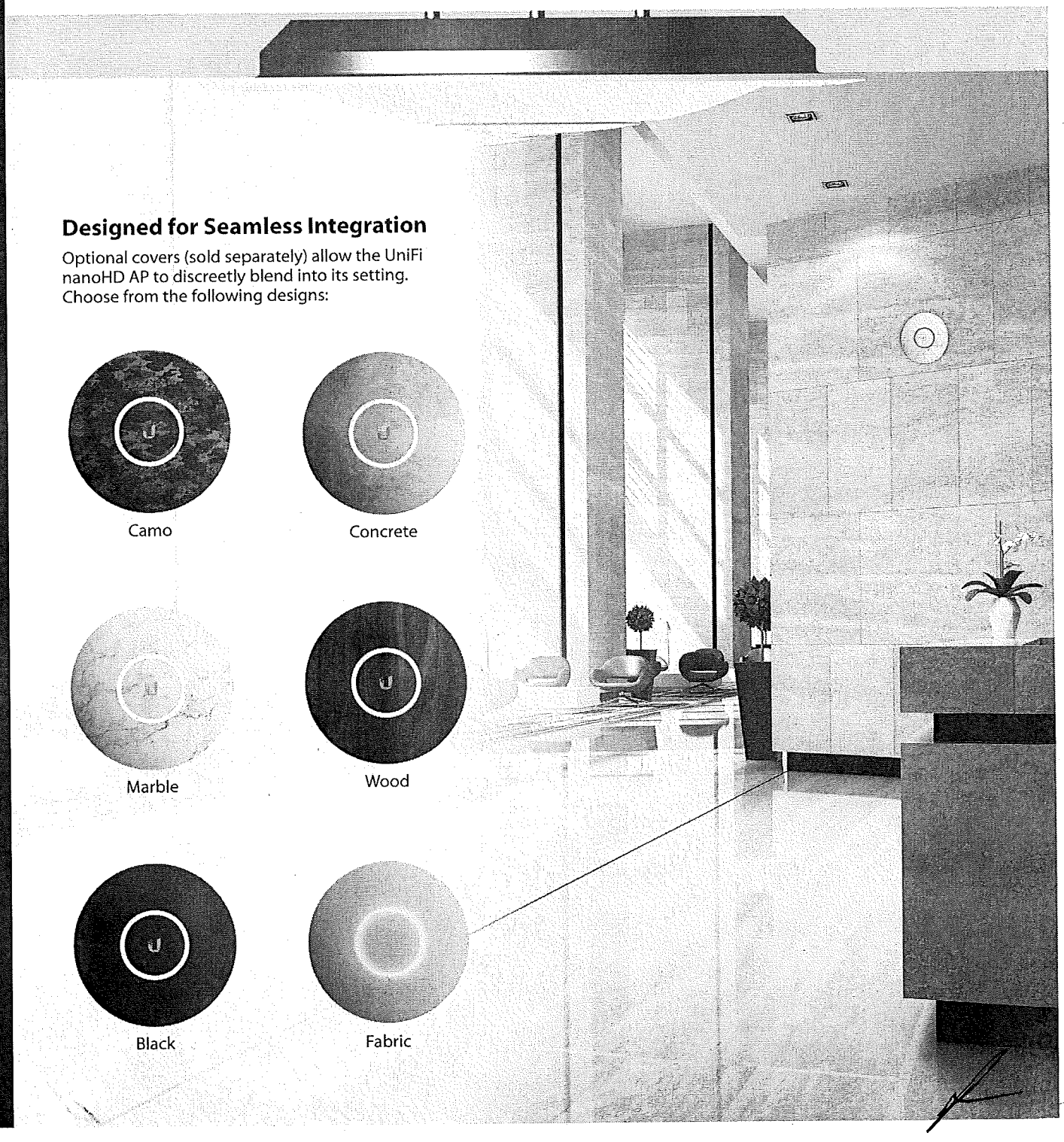
Low-Profile Mounting The UniFi nanoHD AP's low-profile ceiling mount (sold separately) allows you to seamlessly integrate the AP into its environment.

Compact Form Factor The compact design delivers a cost-effective combination of value and performance.

LED The unique LED provisioning ring provides administrator location tracking and alerts for each device.

Power over Ethernet (PoE) Standard The UniFi nanoHD AP can be powered by an 802.3af PoE compliant switch. We recommend powering your UniFi devices with a UniFi PoE Switch (sold separately). The UniFi nanoHD AP is compatible with all UniFi PoE Switches and 48V adapters.

Superior Processing Power The UniFi nanoHD AP is capable of complex operations (guest control, filtering, and other resource-intensive tasks) that may slow down a lesser-equipped AP.



Designed for Seamless Integration

Optional covers (sold separately) allow the UniFi nanoHD AP to discreetly blend into its setting. Choose from the following designs:

Camo

Concrete

Marble

Wood

Black

Fabric

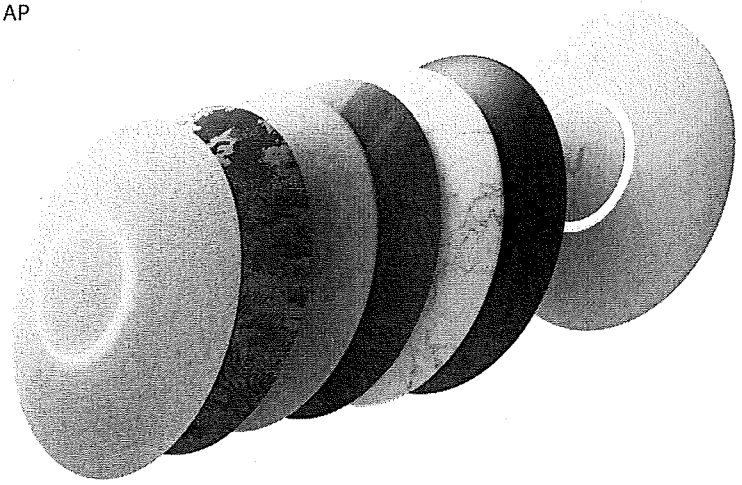
Accessories

The use of optional accessories* makes the UniFi nanoHD AP extremely versatile in its deployment. The UniFi nanoHD AP offers a variety of mounting and stylistic options to fit your individual application needs.

** All accessories sold separately.*

nanoHD Covers

The UniFi nanoHD AP covers allow the nanoHD AP to integrate into a wide variety of backgrounds. Whether you are mounting your AP against a marble, concrete, or wood backdrop, the UniFi nanoHD AP will blend in seamlessly.



The following nanoHD cover models are available in three-packs:

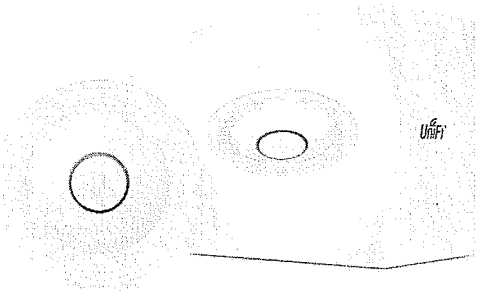
- nHD-cover-Fabric-3
- nHD-cover-Camo-3
- nHD-cover-Concrete-3
- nHD-cover-Wood-3
- nHD-cover-Marble-3
- nHD-cover-Black-3

Versatile Mounting Options

Recessed Ceiling Mount

Model: nanoHD-RCM-3

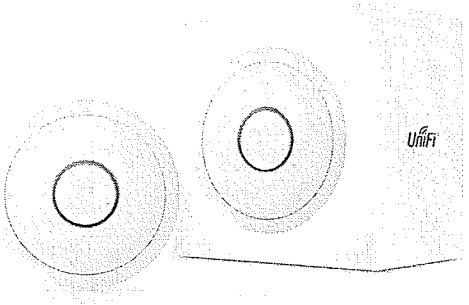
Use the UniFi nanoHD AP Recessed Ceiling Mount for an integrated ceiling deployment. Designed as a low-profile mounting option, the Recessed Ceiling Mount sits discreetly within your ceiling to create a sleek look. Available in three-packs.



RetroFit Mount

Model: nanoHD-RetroFit-3

The UniFi nanoHD AP RetroFit Mount makes upgrading to the UniFi nanoHD AP quick and convenient. The RetroFit Mount allows you to mount the UniFi nanoHD AP over existing UniFi AP mounting brackets, with no additional tools needed. Available in three-packs.



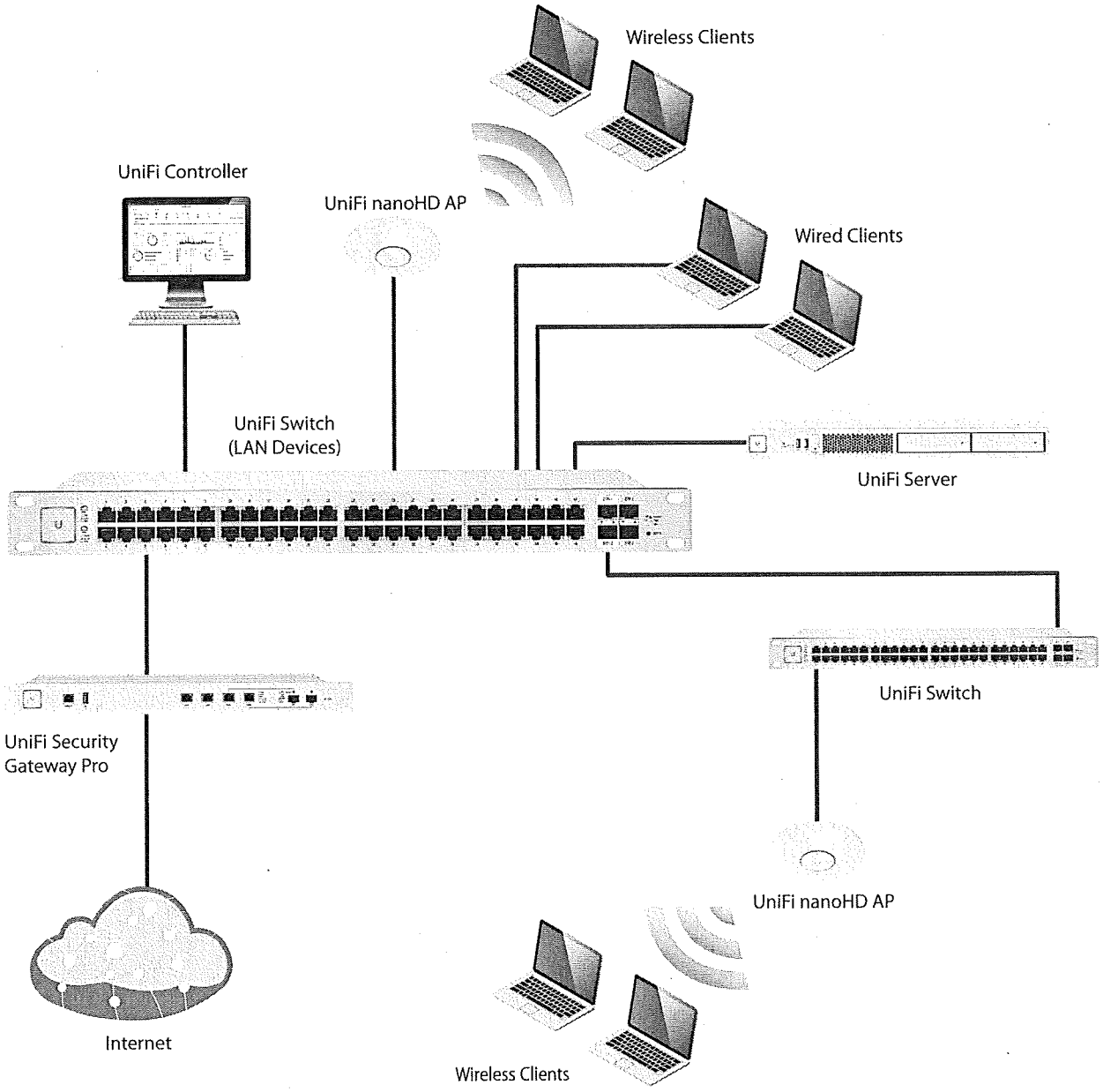
Specifications

UAP-nanoHD	
Dimensions	160 x 160 x 32.65 mm (6.30 x 6.30 x 1.29")
Weight With Mounting Kits	300 g (10.6 oz) 315 g (11.1 oz)
Networking Interface	(1) 10/100/1000 Ethernet Port
Buttons	Reset
Power Method	802.3af PoE
Power Supply	UniFi Switch (PoE)
Power Save	Supported
Beamforming	Supported
Maximum Power Consumption	10.5W
Supported Voltage Range	44 to 57VDC
TX Power 2.4 GHz 5 GHz	 23 dBm 26 dBm
MIMO 2.4 GHz 5 GHz	 2x2 4x4
Radio Rates 2.4 GHz 5 GHz	 300 Mbps 1733 Mbps
Antennas 2.4 GHz 5 GHz	 (2) Single-Port, Single-Polarity Antennas, 2.8 dBi each (2) Single-Port, Dual-Polarity Antennas, 3 dBi each
Wi-Fi Standards	802.11 a/b/g/n/r/k/v/ac/ac-wave2
Wireless Security	WEP, WPA-PSK, WPA-Enterprise (WPA/WPA2, TKIP/AES), 802.11w/PMF
BSSID	8 per Radio
Mounting	Wall/Ceiling (Kits Included)
Operating Temperature	-10 to 70° C (14 to 158° F)
Operating Humidity	5 to 95% Noncondensing
Certifications	CE, FCC, IC

Advanced Traffic Management	
VLAN	802.1Q
Advanced QoS	Per-User Rate Limiting
Guest Traffic Isolation	Supported
WMM	Voice, Video, Best Effort, and Background
Concurrent Clients	200+

Supported Data Rates (Mbps)	
Standard	Data Rates
802.11a	6, 9, 12, 18, 24, 36, 48, 54 Mbps
802.11n	6.5 Mbps to 300 Mbps (MCS0 - MCS15, HT 20/40)
802.11ac	6.5 Mbps to 1.7 Gbps (MCS0 - MCS9 NSS1/2/3/4, VHT 20/40/80) 58 Mbps to 1.7 Gbps (MCS0 - MCS9 NSS1/2, VHT 160)
802.11b	1, 2, 5.5, 11 Mbps
802.11g	6, 9, 12, 18, 24, 36, 48, 54 Mbps

System Example



Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
The limited warranty requires the use of arbitration to resolve disputes on an individual basis, and, where applicable, specify arbitration instead of jury trials or class actions.
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www.ubnt.com

RB3011UiAS-RM

The RB3011 is a new multi port device, our first to be running an ARM architecture CPU for higher performance than ever before. The RB3011 has ten Gigabit ports divided in two switch groups, an SFP cage and for the first time a Superspeed full size USB 3.0 port, for adding storage or an external 3G/4G modem.

Unit comes with 1U rackmount enclosure, a touchscreen LCD panel, a serial console port and PoE output functionality on the last Ethernet port.

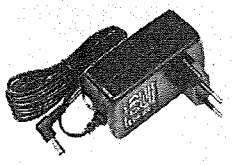
Specifications

Product code	RB3011UiAS-RM
CPU nominal frequency	1.4 GHz
CPU core count	2
Size of RAM	1 GB
10/100/1000 Ethernet ports	10
Switch chip model	QCA8337-AL3C-R
Power Jack	1
PoE in	Yes (passive only)
PoE out	Yes (port 10)
Supported input voltage	10 V - 30 V
Voltage Monitor	Yes
PCB temperature monitor	Yes
Dimensions	443x92x44mm
License level	5
Operating System	RouterOS
CPU	IPQ-8064
Max Power consumption	10 W

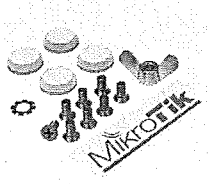
Specifications

SFP port	1
USB slot type	USB 3.0 type A
Number of USB ports	1
Serial port	RJ45
Suggested price	$179

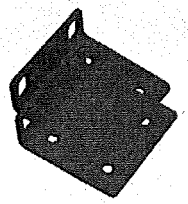
Included



24V 1.2A Power adapter



K-19 fastening set



Rack ears

Performance test results

RB3011UiAS		All port test		RouterOS v6.30rc23			
Mode	Configuration	1518 byte		512 byte		64 byte	
		Mbps	kpps	Mbps	kpps	Mbps	kpps
Bridging	none (fast path)	3,946.8	325.0	3,849.4	939.8	783.5	1,530.2
Bridging	25 bridge filter rules	3,946.8	325.0	1,573.7	384.2	178.5	348.6
Routing	none (fast path)	3,946.8	325.0	3,849.4	939.8	736.1	1,437.6
Routing	25 simple queues	3,946.8	325.0	1,718.7	419.6	214.9	419.7
Routing	25 ip filter rules	2,453.1	202.0	836.0	204.1	96.5	188.4

1. All tests are done with Xena Networks specialized test equipment (XenaBay),and done according to RFC2544 (Xena2544)
2. Max throughput is determined with 30+ second attempts with 0,1% packet loss tolerance in 64, 512, 1518 byte packet sizes
3. Values in Italic indicate that max throughput was reached without maxing out CPU, but because board interface configuration was maxed out
4. Test results show device maximum performance, and are reached using mentioned hardware and software configuration, different configurations most likely will result in lower results