## Quad-Radio 802.11ac Wave 2 4x4:4 UHD Outdoor Access Point

Everest Networks provides the industry's leading Wi-Fi solutions addressing today's most pressing ultra-high density (UHD) challenges, such as high user engagement, high network capacity, fast throughput, and low total cost of ownership (TCO). Our solutions leverage the Everest Wi-Fi platform, designed and built specifically for UHD venues such as stadiums, arenas, convention centers, shopping malls, transport hubs, auditoriums, campuses, and smart cities.

### AN INDUSTRY FIRST

A foundational block of the Everest platform is the AP1004UN*e*, a ruggedized IP-67, high performance access point (AP) for long- to very-long-range coverage. It is a first-of-its-kind, next-generation, multi-gigabit 802.11ac AP featuring the industry's most advanced and unique RF capabilities including quad 802.11ac Wave 2 radios, patented antenna technology enabling multi-radio beam-forming and shaping, along with 2x2:2 MIMO and 4x4:4 MU-MIMO capabilities.

### BUILT FROM THE GROUND UP

At its core, the AP1004UN*e* employs, for an industry's first, four radios, including three in the 5-GHz band, which can operate simultaneously at full bandwidth without any RF coverage compromises. In addition, the AP1004UN*e* employs a patented multi-antenna system incorporating strategically-placed, high-gain and optimized antennas with highly-directional patterns, providing proprietary reconfigurable beam-forming and beam-shaping capabilities. This enables a variety of coverage patterns from 15°-narrow directional to 45°-narrow directional. The AP1004UN*e* can thus be mounted at far-range locations achieving extended coverage zones with dual hot spots while simulataneously enhancing client device performance. These features, along with polarization and pattern diversity, provide an advantageous versatility for RF coverage and interference mitigation. Consequently, the AP1004UN*e* attains an industry-leading highest user engagements and capacity per AP combined with an unsurpassed level of deployment flexibility and installation simplicity, speed, and low TCO.

The AP1004UN*e* also provides additional capabilities such as advanced radio resource management, active multi-radio client load balancing, and assisted roaming, which are

### UNIQUE BENEFITS

- Concurrent **quad-radio** 802.11ac Wave 2 4x4:4 → PHY data rate up to **3.33 Gbps**
- Up to **1,000** associated devices per AP
- Up to **199+** active devices per AP
-  **5 Gbps** backhaul provided by 2 x 2.5G PoE+ Ethernet ports
- Internal, high-gain antennas with highly-directional and ultra-narrow beams
- Patented antenna beam-forming and shaping technology:
    - 2.4 GHz → reconfigurable patterns:
      60° x 30°, 110° x 30°,
    - 5 GHz → reconfigurable patterns:
      15˚ x 15˚, 30˚ x 30˚, and 30˚ x 45˚
- 5 GHz (2 radios) → 2x2:2SS for 2x2 SU-MIMO devices per radio
- 2.4/5 GHz (2 radios) → 4x4:4SS for:
    - 4x4 SU-MIMO devices per radio
    - Up to 3 concurrent MU-MIMO devices per radio (5 GHz)
- Simultaneous polarization and pattern diversity for efficient MIMO and MU-MIMO
- IP67 rated for outdoor and industrial indoor environments

fully supported and managed by Everest's WLAN controller wireless management system. Through Everest's WLAN controller's simple and clear user interface, the AP1004UN*e* can be easily and quickly configured, managed, monitored, and assessed with minimal user interaction, providing operational efficiency and system scalability (up to 1,000 APs) without compromise.

# FEATURES & BENEFITS

## CONCURRENT QUAD-RADIO FOR UP TO 3.33 GBPS

The AP1004UN*e* leverages the combined power of four radios: one 2.4 GHz and one 5 GHz radio operate in 4x4:4SS mode while two additional 5 GHz radios operate in 2x2:2SS mode, for a total of 12 parallel spatial streams. In addition, dual 2.5 Gbps Ethernet ports provide up to 5 Gbps of wired backhaul. The AP1004UN*e* features a patented design and system architecture enabling concurrent quad-radio operation without impacting the radio's performance for best-in-class aggregate PHY throughput of 3.33 Gbps. In addition, the patented design does not compromise RF performance and radio coverage, making the AP1004UN*e* amenable to many different deployment venues.



| 800Mbps 2.4GHz | 867Mbps 5GHz | 867Mbps 5GHz | 800Mbps 5GHz |
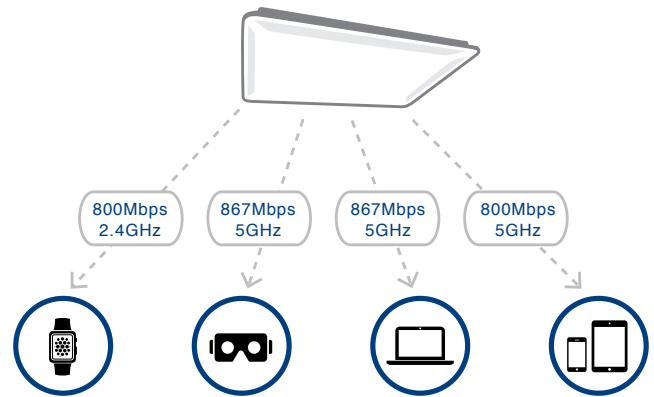
## PATENTED ANTENNA TECHNOLOGY

The AP1004UN*e* has a patented, fully-integrated, software-adjustable, high-gain antenna system with the following characteristics: band-optimized, very tightly-controlled radiation patterns with low side-lobe levels, polarization and pattern diversity, as well as beam angle and shape reconfigurability. Band-optimized antennas are particularly important for directional antennas to control side-lobe levels and maximize gain over the entire spectrum; polarization and pattern diversity provide enhanced MIMO and MU-MIMO operation; beam angle and shape reconfigurability enable focusing energy to various spatial sectors for RF zone control and shaping, and interference management. The AP1004UN*e*'s high-gain antennas and highly-directional beams enable coverages from long-range distances, achieving well-confined service areas while enhancing client performances simultaneously. Finally, the AP1004UN*e*'s internal antennas reduce signal loss, effectively increasing Tx/Rx power, reducing installation times and errors. These unique features provide system designers and integrators unparalleled flexibility in various deployment venues, maximizing network capacity with fewer APs and faster install times.
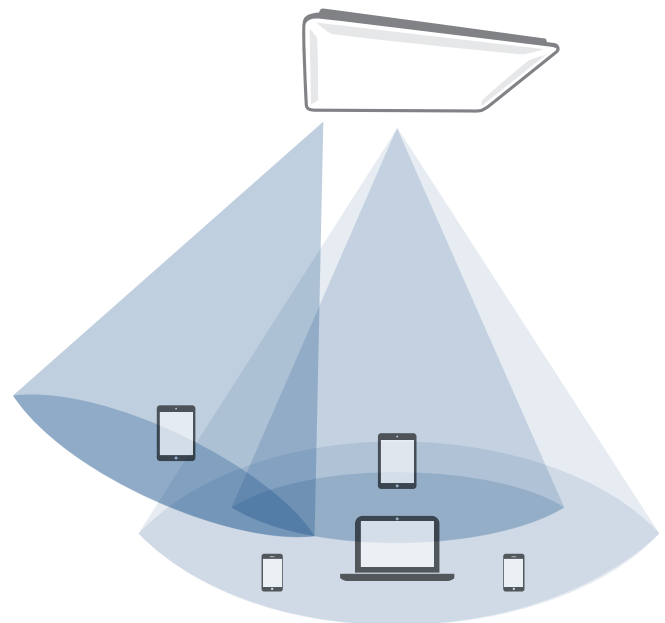


## ACTIVE CLIENT ROAMING & LOAD BALANCING

Our patent-pending load balancing algorithms performs traffic management to optimize client associations, throughput, and roaming. Based on 802.11k and 802.11v protocols, the algorithm dynamically balances users between intra- and inter-AP radios to maximize radio, client and network performance and capacity.

## AUTO DISCOVERY

Upon power-up, the AP1004UN*e* is auto-discovered by Everest's WLAN controller which performs AP verification and authorization before commencing data transfer. Once authorized, updated firmware and AP configuration are downloaded in a secured and controlled tunnel for an efficient and fast bring-up and operation.

## RUGGED INDUSTRIAL DESIGN

The AP1004UN*e* is IP67-rated, designed and tested for salt spray, vibration, extreme thermal conditions, shock, and dust. This allows the 1004UN*e* to operate in the toughest environments. A compliment of mounting brackets and accessories ensures that these APs are not only aesthetically pleasing, but also quick to deploy.

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# SPECIFICATIONS

## Performance and Capacity
### Associated Devices
Up to 1,000

### Active Devices
Up to 199+

### Peak PHY Rates
5 GHz: 2.533 Gbps (aggregate)

2.4 GHz: 800 Mbps

Total: 3.333 Gbps

### Backhaul
5 Gbps (2x 2.5 Gbps Ethernet ports)

## Advanced Radio Technology
### Radios Per AP
5 GHz: 3x 802.11ac Wave 2

2.4 GHz: 1x 802.11n

### MIMO
4x4 (SU-MIMO and MU-MIMO)

### MIMO Streams
SU-MIMO:
- 4 streams for 4x4 devices (2.4/5 GHz)
- 2 streams for 2x2 devices (5 GHz)
- Max.: 433.3 Mbps per stream
- Max.: 866.7 Mbps (5 GHz)

MU-MIMO (5 GHz):
- 3 streams for 3 concurrent devices

### Features
TPC, DFS, TxBF, SGI

MRC, MLD, CDD, STBC, LDPC

### Max Tx Power (varies by country code, band, MCS)
2.4 GHz: 24 dBm

5 GHz: 15 dBm

### Rx Sensitivity
802.11n (MCS0, HT20): -93 dBm

802.11ac (MCS0, VHT20): -93 dBm

## Antenna Characteristics
### Antenna Characteristics
Band-optimized and reconfigurable

Internal and integrated

High gain, highly-directional

Pattern, polarization, spatial

### Antenna Patterns
2.4 GHz: 60˚ x 30˚, 110˚ x 30˚

5 GHz: 15˚ x 15˚, 30˚ x 30˚, 45˚ x 30˚

### Max Physical Antenna Gain
2.4 GHz: 11.5 dBi

5 GHz: 19.25 dBi

## WiFi Specifications
### Supported Standards
IEEE 802.11a/b/g/n/ac

### Supported Rates
802.11b: 1 - 11 Mbps

802.11a/g: 1 - 54 Mbps

802.11n: 6.5 - 600 Mbps (MCS0-31, 1 - 4 SS)

802.11ac Wave 2: 6.5 to 1.733 Gbps (MCS0-9, 1 - 4SS)

802.11n-2.4 GHz: 6.5 - 400 Mbps (MCS0-9, 1 - 4SS)

802.11 HT: HT20/40

802.11 VHT: VHT20/40/80

### Supported Channels (availability based on country code)
2.4 to 2.472 GHz: 1 - 13 (FCC/IC)

2.4 to 2.4835 GHz: 1 - 14 (ETSI)

5.15 - 5.25 GHz: 36 - 48 (FCC: U-NII-1/IC/ETSI)

5.25 - 5.35 GHz: 52 - 64 (FCC: U-NII-2A/IC/ETSI)

5.47 - 5.725 GHz: 100 - 140 (FCC: U-NII-2C/IC/ETSI)

5.725 - 5.850 GHz: 149 - 165 (FCC: U-NII-3/IC)

### Channelization
20/40/80 MHz

### Security
Wi-Fi Protected Access (WPA)

IEEE 802.11i (WPA2, RSN)

Transport Layer Security (TLS)

Datagram Transport Layer Security

IEEE 802.1X

Encryption: AES, CBC, CCM CCMP128,256

## Power
### Max Input Power (per port)
POE: 12.95 W @ 37 - 56 VDC

POE+: 25.5 W @ 42.5 - 56 VDC

4PPoE+: 30 W @ 42.5 - 56 VDC

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**Max Power Consumption**

45 W (~2.56 BTUs/min)

## Physical Interfaces
**Ethernet**

2x 100/1000/2500 Mbps

Auto-sensing

802.3u 100 Base-Tx

802.3ab 1000 Base-T

802.3bz 2.5G Base-T

PoE 802.3at (Type I) [802.3af]

PoE+ 802.3at (Type II) [802.3at]

4P PoE 802.3bt (draft)

LLDP

## Physical Characteristics
**Dimensions**

590 mm x 462 mm x 108 mm

23.2 in x 18.2 in x 4.25 in

**Weight**

7.3 Kg (16.2 lbs)

**Environmental**

Operating temperature: -40°C to 55°C (-40°F to 131°F)

Storage temperature: -40°C to 70°C (-40°F to 158°F).Below -20°C: up to 20 min. for minimum internal operating temperature of -20°C

Operating humidity: 5% to 95% non-condensing

Operating altitude: 3000 m

Shock and vibrations: ETSI 300-19-2-4 spec T41.E 4M3

Surge immunity: 1 kV

Lightning protection: - 4 kV (with optional external primary protection)

Air vent valve for balancing humidity and pressure

UV resistant

Ice pellets: up to 25 mm (radial)

Corrosion: 10 - year protection

IP67 rated (water, dust, smoke)

## Management
**Wireless and Traffic: Standards**

802.11e QoS

802.11k RRM

802.11r Fast BSS transition (FT)

802.11v Wireless Network Management

802.11ae Prioritization of Management Frames

**Wireless and Traffic: Features**

Airtime fairness

Client load balancing

Dynamic radio management based on per: client, radio, and AP metrics

**Interfaces**

Everest's WLAN controller: WMS and AC

## Certification and Compliance
**Wi-Fi Alliance**

Wi-Fi Certified n, ac

Wi-Fi Protected Access (WPA2)

Protected Management Frames

Voice-Enterprise

WMM® (Wi-Fi Multimedia™)

**Regulatory and Safety**

Emissions (EMI/EMC):
- FCC Part 15, Class B
- ICES-003 issue 6, Class B
- VCCI (CISPER 32)

Radio:
- FCC Part 15c, part 15e (US)
- RSS-247 (Canada)
- ARIB STD-T66, ARBI STD-77 (Japan)

Surge: IEC 61000-4-5 Edition 2.0 2014, EN61000-4-5:2014

Safety:
- UL60950-1/ IEC60950-1
- UL60950-22/ IEC60950-22

Shock and vibrations:
- IEC 68-2-27
- IEC 68-2-06

## Reliability
**MTBF**

184,874 hours (calculated)

**MTTR**

30 minutes

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