

## Quad-Radio 802.11ac Wave 2 4x4:4 UHD Indoor 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 component of the Everest platform is the AP1004WRi, a high performance access point (AP) for short- to mid-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 radios, patented antenna technology enabling multi-radio beam-forming and shaping, 4x4:4 MIMO and MU-MIMO capabilities, dual-band scanning radio and Bluetooth Low-Energy (BLE) radio.

### BUILT FROM THE GROUND UP

At its core, the AP1004WRi 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 AP1004WRi employs a patented multi-antenna system incorporating strategically-placed, directional, down-tilted and optimized antennas, providing proprietary reconfigurable beam-forming and beam-shaping capabilities. This enables a variety of coverage patterns from 140°-wide directional to 90°-wide directional, thus achieving an advantageous versatility for RF coverage and interference mitigation. Compared with omni-directional APs, these features, along with polarization and pattern diversity, provide improved spatial reuse mechanisms for an enhanced 4-stream MIMO and MU-MIMO functionalities. Consequently, the AP1004WRi 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 AP1004WRi also provides additional capabilities such as advanced radio resource management, active multi-



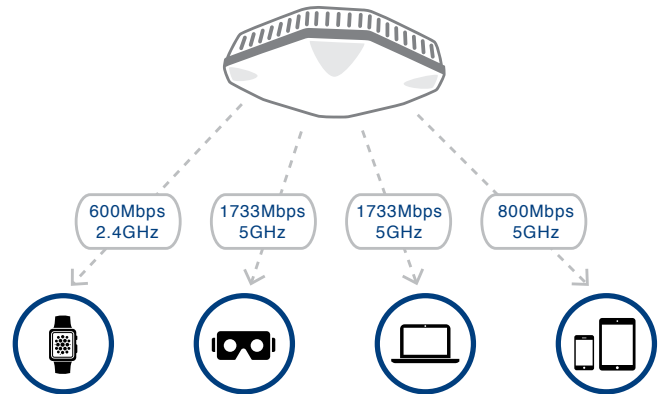
### UNIQUE BENEFITS

- Concurrent **quad-radio** 802.11ac Wave 2 4x4:4 → PHY data rate up to **4.87 Gbps**
- Up to **1,000** associated devices per AP
- Up to **199+** active users per AP
- **5 Gbps** backhaul provided by 2 x 2.5G PoE+ Ethernet ports
- Patented antenna beam-forming and shaping technology:
  - 2.4 GHz: fixed pattern → 90° x 90°
  - 5 GHz: software-reconfigurable patterns 90° x 90° to 140° x 140°
- Simultaneous polarization and pattern diversity for efficient MIMO and MU-MIMO
- 4x4:4SS per 5 GHz radio for:
  - 4x4 SU-MIMO devices per radio
  - Up to 3 concurrent MU-MIMO devices per radio
- 3x3:3 streams for 2.4 GHz radio
- Dual-band scanning and BLE radios

radio client load balancing, and assisted/enhanced roaming, which are fully supported and managed by Everest's WLAN controller wireless management system. Through Everest's WLAN controller's simple and clear user interface, the AP1004WRi 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.

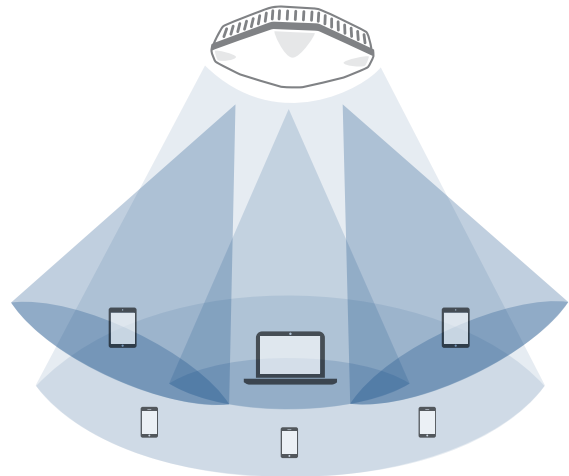
## CONCURRENT QUAD-RADIO FOR UP TO 4.866 GBPS

The AP1004WRi leverages the combined power of four radios, one 2.4 GHz (3x3:3) and three 5 GHz radios (4x4:4), for a total of 15 parallel streams. In addition, dual 2.5 Gbps Ethernet ports provide up to 5 Gbps of wired backhaul. The AP1004WRi also offers a BLE radio while the 2.4 GHz radio can be fully or partially repurposed for dual-band intrusion detection and spectrum monitoring. The AP1004WRi 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 4.866 Gbps. In addition, the patented design does not compromise RF performance and radio coverage, making the AP1004WRi amenable to different deployment venues and scenarios.



## PATENTED ANTENNA TECHNOLOGY

The AP1004WRi has a patented, fully-integrated, software-adjustable antenna system with the following characteristics: band-optimized, tightly-controlled radiation patterns, polarization and pattern diversity, as well as beam angle and shape reconfigurability. Band-optimized antennas enable optimal radiation in the entire spectrum; polarization and pattern diversity provide enhanced MIMO and MU-MIMO operation; beam angle and shape reconfigurability enable direct energy to various spatial sectors for radio coverage zone control and interference management. 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 AP1004WRi 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.

## Performance and Capacity

### Associated Devices

Up to 1,000

### Active Devices

Up to 199+

### Peak PHY Rates

5 GHz: 4.266 Gbps (aggregate)

2.4 GHz: 600 Mbps

Total: 4.866 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 (per radio)

SU-MIMO:

- 4 streams for 4x4 5 GHz devices
- 3 streams for 3x3 2.4 GHz devices
- Max.: 433.3 Mbps per stream
- Max.: 1,733 Mbps (5 GHz)

MU-MIMO:

- 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: 24 dBm

### Rx Sensitivity

802.11n (MCS0, HT20): -93 dBm

802.11ac (MCS0, VHT20): -93 dBm

### Other

Dual-band scan radio and BLE radio

## Antenna Characteristics

### Antenna Characteristics

Band-optimized, reconfigurable

Internal and integrated

Directional and down-tilted

Pattern, polarization, spatial

### Antenna Patterns

2.4 GHz: 90° x 90°

5 GHz: 90° x 90° to 140° x 140°

### Max Physical Antenna Gain

2.4 GHz: 5 dBi

5 GHz: 5 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 - 600 Mbps (MCS0-9, 1 - 3SS)

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, CCMP

## Power

### Max Input Power (per port)

POE+: 25.5 W @ 42.5 - 57 VDC

4PPoE: 51.0 W @ 42.5 - 57 VDC

### Max Power Consumption

40 W (~2.27 BTUs/min)

## DC

12VDC input @ 3.33 A

## Optional

AC/DC converter:

- Input: 110-240 VAC ~ 2A 50-60 Hz

- Output: 12VDC ~5.5 A

## 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

261 mm x 261 mm x 84 mm

10.2 in x 10.2 in x 3.3 in

### Weight

3.4 Kg (7.5 lbs)

## Environmental

Operating temperature: 0°C to 45°C (32°F to 113°F)

Storage temperature: -40°C to 85°C (-40°F to 185°F).

Operating humidity: 5% to 95% non-condensing

Operating altitude: 3000 m

Surge immunity: 1 kV

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

## 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

Shock and vibrations:

- IEC 68-2-27

- IEC 68-2-06

### Reliability:

#### MTBF

143,913 hours (estimated)

#### MTTR

30 minutes