E Extreme™ Customer-Driven Networking

#### Highlights

#### **High Density Environments**

- Delivers exceptional end-user experience even in dense user environments such as stadiums, large public venues, convention centers and school auditoriums.
- Software configurable for dual 5 GHz 11ax radios for the most challenging environments.

# Connects More Users and Devices Simultaneously

 Improve user experience and device performance with 8 spatial streams (4x4:4 5 GHz, 4x4:4 2.4 GHz), with MU-MIMO and OFDMA technology.\*

#### Latest in Secure Wi-Fi

• Includes the latest WPA3 Wi-Fi security standard with 192-bit encryption and delivering robust protections for users and IoT devices.

#### Optimizes RF for the Optimal User Experience

 ExtremeAI and SmartRF uses AI/ML technology to monitor and automatically adjust Wi-Fi radios to achieve the best coverage and greatest client performance, even in dynamic RF environments.

#### **Redundant PoE**

 Mission critical networks for 24/7 operations.

#### Cellular Coexistence Filter (CCF)

• Minimizess the impact of interference from cellular networks.

#### Fully Functional AP510i on 802.3at

• Limit Performance on 802.3 af.

# Integrated Bluetooth for IoT and Guest Engagement

 Leverage the integrated Bluetooth to connection to IoT devices with Thread™or engage loyalty customers with Apple iBeacon™. Enterprises can use Google Eddystone™ to send advertisements directly to shoppers, guests, and conference attendees, even without a loyalty app pre-installed. This makes it ideal for businesses to advertise their app-download pages, captive portals, or site-specific information.

#### Adaptive Smart OmniEdge Management

- ExtremeCloud<sup>™</sup> delivers a powerful user experience with simple and secure network management.
- ExtremeCloud™ Appliance is ideal for campus or private cloud requirements.

\* Available in future software release



# ExtremeMobility<sup>™</sup> AP510i/e 802.11ax Indoor Access Point

Setting New Standards in High-Performance Enterprise Wi-Fi 6

# **Product Overview**

The mobile revolution is upon us. Enterprises are implementing digital transformation to connect with users, employees, guests, customers and IoT devices to help them better understand and manage their business, improve efficiencies, as well as the experience of their brand to customers and stock holders. However, today's Wi-Fi users have higher expectations, consume more bandwidth, and have less patience with a poor Wi-Fi experience. This is a challenge for every enterprise, as they struggle to keep pace with the seemingly exponential growth of Wi-Fi demand and data hungry applications – until now.

Designed to leverage the performance improvements delivered with 802.11ac wave 2, 802.11ax borrows key technology from cellular to increase device capacity and improve spectral efficiency, extracting more out of available Wi-Fi spectrum. Bottom line, 802.11ax will support more users and IoT devices, providing each the spectrum they require, future proofing enterprise wireless networks, while minimizing the upgrade fatigue they have been experiencing to date.

#### Purpose Built to Meet the Needs of Many

Extreme's AP510i/e is a high performance, enterprise class 802.11ax access point at the price/performance point that is ideal for many verticals, including; retail, education, hospitality and healthcare. These enterprises need to support a high density of users and IoT devices, while delivering an exceptional user experience.

#### The AP510i/e is managed by the Smart OmniEdge

solution and powered by the WiNG 7 operating system. WiNG's legendary distributed architecture places the intelligence at the edge where it unleashes the true capabilities and performance of 802.11ax, without bottlenecks and limits. WiNG incorporates the functionality of a controller in each access point, enabling network solutions with controller-less solutions using a virtual controller that supports up to 64 access points or

1

**Data Sheet** 

distributed solutions comprised of branch sites with up to 256 access points per site. The solution can scale to 25,000 access points and are managed with a simple, cloud UI and workflow with ExtremeCloud or ExtremeCloud Appliance for campus and private cloud networks.

## Extreme Software Configurable Radio

Industry's first 802.11ax access point with three software programmable modes to optimally manage for dual 5 GHz radios for the most dense environments. The AP510i/e is managed by the Smart OmniEdge solution and powered by the WiNG 7 operating system allows for software configurable radios. Network managers can determine software network topology based on user environment and configure the access points in different modes of operations:

Mode 1 - Traditional dual radio 2.4 GHz and 5 GHz radio Mode 2 - 2.4 GHz/5 GHz sensor Radio 1 and 5 GHz on Radio 2 Mode 3 - Dual 5 GHz radio

## Managing the Complexity of RF

Network managers will appreciate a powerful choice of RF management for their 802.11 networks, with SmartRF or ExtremeAI. WiNG's SmartRF, is a robust RF management system with AI/ML 'like' functionality. Built on 10 years of experience across thousands of large scale networks and millions of access points, SmartRF's algorithms manage channels, radios, load balancing, band steering and many other attributes of the RF.

For enterprises with highly dynamic RF environments, ExtremeAI is a hosted service which delivers the latest in AI/ML technology for RF networks. ExtremeAI monitors and learns the behavior of all your Smart OmniEdge RF networks and applies artificial intelligence to auto tune the network to achieve optimum performance and user experience. Applied to 802.11ax, this technology will lessen the workload of network engineers, while ensuring their network users have the best experience.

## ExtremeCloud and ExtremeCloud Appliance

The AP510i/e is the latest access point in the Smart OmniEdge portfolio. Network managers have a choice of cloud or premise-based solutions; both using the same UI and workflows. ExtremeCloud is a hosted cloud service, while ExtremeCloud Appliance is designed for premise-base solutions of campus and private cloud. Both support secure zero touch provisioning that significantly reduces deployment time connectivity via a single pane of glass for unified management of Extreme wired and wireless components in your network. See the ExtremeCloud and ExtremeCloud Appliance data sheets for details and ordering part numbers.

### 802.11ax Technology

Whereas prior generations of 802.11n, 802.11ac wave 1 and 2, can be considered generational improvements, each building on the prior standard, the new PHY technology of 802.11ax adds a significant level of new technology which takes Wi-Fi networks to an entirely new level.

The following table provides a brief description of the various new elements in the 802.11ax standard. To learn more about 802.11ax, go to: https://www.extremenetworks .com/are-you-ready-for-802-11ax/

### Key 802.11ax Client Technologies

|                                       |  | AP510i/e<br>Features<br>Supported |
|---------------------------------------|--|-----------------------------------|
| OFDMA DL/UL                           | Central scheduling of 802.11ax<br>clients reduces contention<br>and overhead, which increases<br>efficiency in scenarios of dense<br>deployments | Future                            |
| E<br>Supports up to 8<br>Clients/TxOP | Capable up supporting up to<br>8 clients simultaneously, uplink<br>and downlink  | Yes, dual 4x4:4<br>radios         |
| Up Link<br>Scheduler                  | Scheduled Up Link access for<br>increased capacity<br>and efficiency   | Future                            |
| 1024 QAM                              | Gigabit Wi-Fi with only 2x2<br>Delivering up to 25% higher<br>data rate vs 256QAM  | Yes                               |
| Target Wake<br>Time                   | Devices decide the frequency<br>they wake to send or receive<br>data, increasing sleep time,<br>while conserving battery life                    | Future                            |
| 2.4 GHz 5 GHz                         | Supports 8 spatial streams, 2X<br>more than 11ac   | Yes                               |
| E                                     | Extends range and performance for clients at the cell boundary   | Yes                               |
| E E<br>BSS Coloring                   | Coloring enables devices to<br>achieve better channel reuse in<br>their own networks   | Future                            |
| ac<br>ax<br>Long OFDM<br>Symbol       | Enables larger coverage areas:<br>E.g. outdoor deployments   | Yes                               |

WWW.EXTREMENETWORKS.COM

# **Specifications**

| Product Features   | AP 510i/e   |
|--|---|
|  | General   |
| Fully-Featured Enterprise Class AP   | 1   |
| Number of Wi-Fi Radios   | 2   |
| MIMO Implementation for High-Performance 11ax, 11ac & 11n<br>Throughputs                   | 4x4   |
| Number of Spatial Streams  | 4 per radio   |
| Number of Simultaneous Users (MU-MIMO)   | <ul> <li>5 GHz radio:</li> <li>Four spatial stream Multi User (MU) MIMO for up to 4.8 Gbps wireless data rate to up to four 1 SS or two 2SS HE160 802.11ax DL-MU-MIMO capable client devices simultaneously (max)*</li> <li>Four spatial stream Multi User (MU) MIMO for up to 2.4 Gbps wireless data rate to up to four 1 SS or two 2SS HE80 802.11ax DL-MU-MIMO capable client devices simultaneously (typical)*</li> <li>2.4 GHz radio:</li> <li>Four spatial stream Multi User (MU) MIMO for up to 1.148 Gbps wireless data rate to up to four 1 SS or two 2SS HE40 802.11ax DL-MU-MIMO capable client devices simultaneously (max)*</li> <li>Four spatial stream Multi User (MU) MIMO for up to 572 Mbps wireless data rate to up to four 1 SS or two 2SS HE20 802.11ax DL-MU-MIMO capable client devices simultaneously (max)*</li> </ul> |
| Maximum Throughput 2.4 GHz Radio   | simultaneously (typical)*<br>1.148 Gbps (40 MHz)  |
| Maximum Throughput 5 GHz Radio   | 4.8 Gbps (Full 5 GHz 160 MHz)   |
| Number of SSIDs Supported Per Radio/Total  | 8/16  |
| Simultaneous Users Per Radio/Total   | 256/512 Per AP  |
| Mode of Operation  | Semi-autonomous/Autonomous  |
| Plug and Play Operation/Zero Touch Deployment  | Yes   |
|  | WPA, WPA2 (AES), WPA3, 802.11i, 802.1x,   |
| Security and Standards   | IPSec, IKEv2, PKCS #10, X509 DER / PKCS #12, SSL  |
| Internet of Things (IoT) Radio   | Dual mode selectable (2.4 GHz with coexistence) Bluetooth<br>Low Energy (BTLE) 4.1<br>- Single and Dual mode operation (Classic and Low<br>Power Profiles 802.15.4 -2011)   |
| Multiple   | Operating Modes   |
| Centralized Data Paths Within Same SSID  | /   |
| Application Based Distributed and Centralized Data Paths Within Same User / Device Session | /   |
| Simultaneous RF Monitoring and Client Services   | /   |
| BYOD / Device Fingerprinting Visibility  | /   |
| Application / Layer 7 Visibility and Control   | /   |
| In-Channel WIDS  | 1   |
| In-Channel WIPS  | /   |
| Dedicated Multi-Channel WIDS (Guardian Mode)   | 1   |
| Dedicated Multi-Channel WIPS (Guardian mode)   | /   |
| Locates Devices and Threats via RF Triangulation   | /   |
| Remote Access Point  | <i>✓</i>  |

\* Available in future software release

| Product Features   | AP 510i/e |  |
|--|-----------|--|
| Hardware-Based, End-to-End Data and Control Plane Encryption   | 1         |  |
| Private and Public Cloud Deployments   | 1         |  |
| Policy Enforcement for Wireless Clients (L2-L7 Access Control, QoS, Rate Limiting, and VLAN Containment) | /         |  |
| Hybrid Operation   |           |  |
| Security Scanning and Serve Clients On Same Radio  | <i>,</i>  |  |
| Multi-Channel Dedicated Security Scanning  | 1         |  |

| Product Features   | AP 510i/e                           |  |
|--|-------------------------------------|--|
| Adaptive Radio Management  |                                     |  |
| Dynamic Channel Control  | 802.11h: DFS and TPC support (ETSI) |  |
| Efficient Use of the Spectrum with A Multi-Channel Architecture            | 1                                   |  |
| Automatic Transmit Power and Channel Control                               | 1                                   |  |
| Self-Healing with Coverage Gap Detection                                   | 1                                   |  |
| Band Steering with Multiple Steering Modes                                 | 1                                   |  |
| Spectrum Load Balancing of Clients   | <i>J</i>                            |  |
| Airtime Fairness   | 1                                   |  |
| Performance Protection In Congested Rf Environments                        | 1                                   |  |
| Fast Transition Roaming (802.11k)  | 1                                   |  |
| Mitigates Co-Channel Interference with Coordinated Access                  | 1                                   |  |
| Mitigates Adjacent Channel Interference with Optimized Receive Sensitivity | 1                                   |  |
| Efficient Reuse of Channels At Shorter Intervals                           | 1                                   |  |
| Mitigates Non 802.11 Interference Without Dedicated Radios                 | 1                                   |  |
| Probe Suppression and Client Link Monitoring                               | 1                                   |  |
| Management Frame Protection (802.11w)                                      | <i>i</i>                            |  |
| Quality c  | of Service                          |  |
| Quality of Service (WMM, 802.11e)  | <i>✓</i>                            |  |
| Power Save (U-APSD)  | 1                                   |  |
| Fast Secure Roaming And Handover Between APs (802.11r)                     | 1                                   |  |
| Pre-Authentication (Pre-Auth)  | <i>✓</i>                            |  |
| Opportunistic Key Caching (OKC)  | 1                                   |  |
| Bonjour/Llmnr/UPNP Identification, Containment and Control                 | 1                                   |  |
| Supports Voice, Video, and Data Using the Same SSID                        | 1                                   |  |
| Prioritizes Voice Over Data for Both Tagged and Untagged Traffic           | <i>✓</i>                            |  |
| Rate Limiting (Rule and User-Based)  | 1                                   |  |
| Rule and Role Based Qos Processing   | <i>✓</i>                            |  |
| Multicast R  | ate Control                         |  |
| Multicast to Unicast Conversion  | 1                                   |  |
| Adaptable Rate Multicast   | J                                   |  |
| Power Save Mode Optimization for Multicast                                 | /                                   |  |

| Product Features      | AP 510i/e  |  |
|-----------------------|--|--|
| Wireless Services     |  |  |
| Media Access Protocol | CSMA/CA with ACK   |  |
| Data Rates            | 802.11b: 1, 2, 5.5, 11 Mbps<br>802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps<br>802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps<br>802.11g: (2.4 GHz); 6.5 to 300 (MCS0 to MCS15, HT20 to HT40)<br>802.11a: (5 GHz); 6.5 to 300 (MCS0 to MCS15, HT20 to HT40)<br>802.11a:: (5.5 to 3467 (MCS0 to MCS9, NSS=1 to 4, VHT20 to VHT160)<br>802.11a:: (2.4 GHz): 3.6 to 574(MSC0 to MSC11, NSS = 1 to 2, HE20 to HE40)<br>802.11a:: (5 GHz): 3.6 to 4803 (MSC0 to MSC11, NSS = 1 to 4, HE20 to HE160)<br>See 802.11a Receiver Sensitivity Table below<br>See 802.11a Receiver Sensitivity Table below  |  |
| Frequency Bands       | 802.11ax/ac/a/n/g:<br>5.15 to 5.25 GHz (FCC/ IC/ ETSI)<br>5.25 to 5.35 GHz (FCC/ IC/ ETSI)*<br>5.47 to 5.725 GHz (FCC/ IC/ ETSI)<br>5.725 to 5.850 GHz (FCC/ IC)<br>802.11b/g/n:<br>2.400 to 2.4720 GHz (FCC/ IC)<br>2.40 0 to 2.4835 GHz (ETSI)<br>*FCC/ IC DFS certification in progress   |  |
| Wireless Modulation   | <ul> <li>802.11ax: OFDMA (1024-QAM)</li> <li>802.11ac: OFDM(BPSK, QPSK, 16-QAM, 64QAM, 256-QAM)</li> <li>802.11ac Packet Aggregation: A-MPDU, A-MSDU 802.11ac Very High- Throughput (VHT): VHT20/40/80</li> <li>802.11ac Advanced Features: LDPC, STBC, Maximum Likelihood (ML) Detection</li> <li>802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)</li> <li>802.11n High-throughput (HT) support: HT 20/40 802.11n Packet aggregation: A-MPDU, A-MSDU 802.11n</li> <li>Advanced Features: LDPC, STBC and TxBF</li> <li>802.11a: OFDM(BPSK, QPSK, 16-QAM, 64-QAM)</li> <li>802.11a: OFDM(BPSK, QPSK, 16-QAM, 64-QAM)</li> <li>802.11b: DSSS and OFDM</li> <li>802.11b: DSSS</li> </ul> |  |

| Max Antenna Gain (Integrated Antenna) |                              |             |           |
|---------------------------------------|------------------------------|-------------|-----------|
| Software Mode                         | Radio 1                      | Radio 2     | IoT Radio |
| Mode 1                                | 2.4 GHz 4 dBi                | 5 GHz 6 dBi | 5 dBi     |
| Mode 2                                | 2.4 GHz 4 dBi<br>5 GHz 5 dBi | 5 GHz 6 dBi | 5 dBi     |
| Mode 3                                | 5 GHz 5 dBi                  | 5 GHz 6 dBi | 5 dBi     |

| Physical Characteristics |  |
|--------------------------|--|
| Dimensions               | AP510i - 9" x 9" x 1.89" (229mm x229mm x 48.15 mm)<br>AP510e - 9" x 9" x 1.89" (229mm x229mm x 48.15 mm) |
| Housing                  | AP510i - 3.40 lbs - 1.54 kg<br>AP510e - 3.45 lbs - 1.56 kg   |
| Mounting                 | WING bracket compatible, Extreme, Multi-Tbar (see mounting section below)                                |
| Configurations           | Above drop ceiling under ceiling or on wall  |
| LAN Ethernet             | 1x 1/ 2.5/ 5 Gbps Ethernet port , RJ45<br>1x 10/100/1000 Mpbs auto-sensing Ethernet port , RJ45          |
| Console port             | RJ45   |
| USB Port                 | USB 3.0 port , Type A for purpose built modules  |
| PoE Failover             | Redundant PoE Capable  |
| LEDs Activity Indication | Two top mounted LEDs - multiple LED radio Indicators   |
| Antenna Connectors       | AP510e - nine RP SMAs  |
| Energy Efficient         | 802.3az Energy-Efficient Ethernet  |
| Anti-Theft Locks         | Kensington Lock<br>Security Hanger Lock  |
| Warranty                 | Limited Lifetime Warranty  |
| MTBF                     | 322,164 Hours AP510i. 323,158 AP510e @ 25° C   |

Note: Actual available power would vary based on local regulatory requirement and actual channels used for operation

| Environmental                 |   |  |
|-------------------------------|---|--|
| Operating Temperature -AP510i | Temperature 0° C to +40 ° C (+32° F to +104° F) @ 6000ft<br>Temperature 0° C to +45 ° C (+32° F to +113° F) @ Sea Level     |  |
| Operating Temperature -AP510e | Temperature -20° C to +50 ° C (-4° F to + 122° F) @ 6000ft<br>Temperature -20° C to +55 ° C (-4° F to + 131° F) @ Sea Level |  |
| Humidity                      | 0 - 95% (noncondensing)   |  |
| Storage and Transportation    | Temperature -40 ° C to +70 ° C (-40 ° F to + 158° F)  |  |
| Electrostatic Discharge       | 15kV air, 8kV contact   |  |

| Power Specifications |  |  |
|----------------------|--|--|
| Operating Voltage    | PoE-PD: 48-57VDC, Wall brick 12VDC   |  |
| Operating Current    | PoE-PD: 500mA at 48V, Wall brick 2A  |  |
| PoE PD Class         | 802.3at  |  |
| Power consumption    | Max: 22 W (specify mode without USB)<br>Idle ( radios ON) : 9.5 W<br>Typical 18 W; Max 22 W  |  |
| Wireless and EMC     |  |  |
| Compliance           | FCC CFR 47 Part 15, Class B<br>ICES-003 Class B<br>FCC Subpart C 15.247<br>FCC Subpart E 15.407<br>RSS-247<br>EN 301 893<br>EN 300 328 |  |
| Safety               | EN 60950-1, 62368-1<br>UL 60950-1, 62368-1<br>CAS 22.2 No. 60950-1-03, 62368-1<br>AS/NZS 60950.1, 62368-1                              |  |

# **Ordering Information**

| Part Number    | Description  |
|----------------|--|
| AP510i-FCC     | Cloud-Ready, Dual 5 GHz, Dual band, Sensor radio, Dual Radio 802.11ax/ac/abgn, 4x4:4 MIMO Indoor 11ax access point. Internal Antenna Domain: US, Puerto Rico, and Colombia                           |
| AP510i-WR      | Cloud-Ready, Dual 5 GHz, Dual band, Sensor radio, Dual Radio 802.11ax/ac/abgn, 4x4:4 MIMO Indoor 11ax access point Internal Antenna. Domain: EMEA and Rest Of World                                  |
| AP510e-FCC     | Cloud-Ready, Dual 5 GHz, Dual band, Sensor radio, Dual Radio 802.11ax/ac/abgn, 4x4:4 MIMO Indoor 11ax access point with external antenna ports. Domain: US, Puerto Rico, and Colombia                |
| AP510e-WR      | Cloud-ready, Dual 5 GHz, Dual band, Sensor radio, Dual Radio 802.11ax/ac/abgn, 4x4:4 MIMO Indoor 11ax access point with external antenna ports. Domain: US, Puerto Rico, and Colombia                |
| AP510i-FCC-TAA | Cloud-ready, Dual 5 GHz, Dual band, Sensor radio, Dual Radio 802.11ax/ac/abgn, 4x4:4 MIMO Indoor 11ax access point Internal Antenna. Domain: US, Puerto Rico, and Colombia TAA Compliant             |
| AP510e-FCC-TAA | Cloud-ready, Dual 5 GHz, Dual band, Sensor radio, Dual Radio 802.11ax/ac/abgn, 4x4:4 MIMO Indoor 11ax access point with external antenna ports. Domain: US, Puerto Rico, and Colombia. TAA Compliant |

| Mounting Options |   |
|------------------|---|
| Part Number      | Description   |
| 37201            | Mounting Plate for Indoor APs (incuded in box)                            |
| KT-135628-01     | Universal Mounting Kit for WLAN APs Requires (37201) bracket for mounting |
| 30518            | WS-MBI-DCMTR01 bracket  |
| 30516            | WS-MBI-WALL04   |
| 37211            | WS-MBI-DCFLUSH  |
| BRKT-000147A-01  | Beam Clip Accessory   |

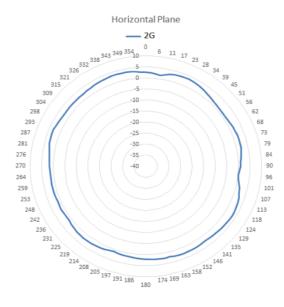
*Note:* See installation guide for mounting descriptions and information.

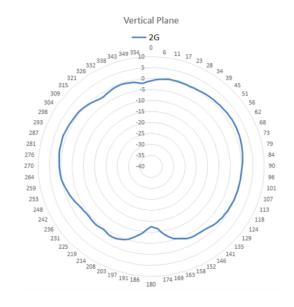
| Mid-Span PoE Devices |  |
|----------------------|--|
| Part Number          | Description                                |
| PD-9001GR-ENT        | Single Port, 1 Gigabit 802.3at PoE Midspan |
| 37219                | PWR 12VDC, 3A, 2.5mm x 5.5mm connector     |

| Antennas (AP510e)  |  |  |  |  |
|--------------------|--|--|--|--|
| Part Number        | Description  |  |  |  |
| ML-2452-APA2-01    | Dipole, 3.2dBi/4.9dBi, dual band, black with RPSMA plug connector (up to 9 per AP)   |  |  |  |
| ML-2452-APA2-02    | Dipole, 3.2dBi/4.9dBi, dual band, white with RPSMA plug connector (up to 9 per AP)   |  |  |  |
| ML-2452-HPA5-036   | Dipole, 3.9dBi/5.7dBi, dual band, outdoor, white with RPSMA plug connector (up to 9 per AP)  |  |  |  |
| ML-2452-HPAG4A6-01 | Dipole, 4dBi/7.3dBi, dual band, outdoor, white with standard N plug connector (up to 9 per AP)   |  |  |  |
| ML-2452-HPAG5A8-01 | Dipole, 5dBi/8dBi, dual band, outdoor, white with standard N plug connector (up to 9 per AP)   |  |  |  |
| ML-2452-PTA4M4-036 | Patch, 360 deg, 4dBi/5dBi, dual band, indoor, with quad feed 36" leads and RPSMA plug connectors (up to 2 per AP)                          |  |  |  |
| ML-2452-PNA5-01R   | Panel, 120 deg sector, 4.5dBi/5dBi, dual band, outdoor, 4" lead with standard N plug connector (up to 9 per AP)                            |  |  |  |
| 30724              | WS-AO-DQ04360N Dipole Omni Array, 5.5dBi/6dBi, dual band, outdoor with quad feed 36" leads and standard N Plug connectors (up to 2 per AP) |  |  |  |
| ML-2452-SEC6M4-036 | Polarized Panel, 100/80 deg, 6.92dBi/7.23dBi, dual band, outdoor with quad feed 32" leads and standard N Plug connectors (up to 2 per AP)  |  |  |  |
| ML-2452-PNA7-01R   | Panel, 68/52 deg sector, 7.8dBi/10.7dBi, dual band, outdoor, 4" lead with standard N plug connector (up to 9 per AP)                       |  |  |  |

# **AP510i Antenna Radiation Patterns**

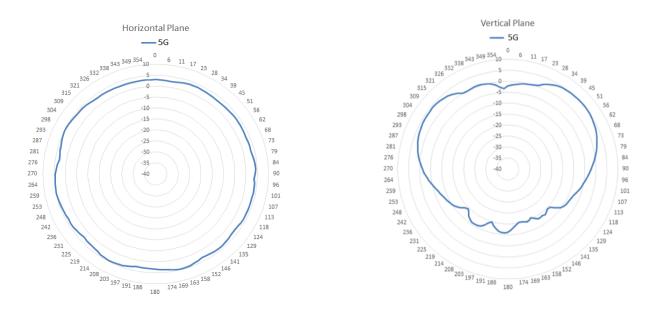






# AP510i Antenna Radiation Patterns (cont.)

5 GHz - Radio 2

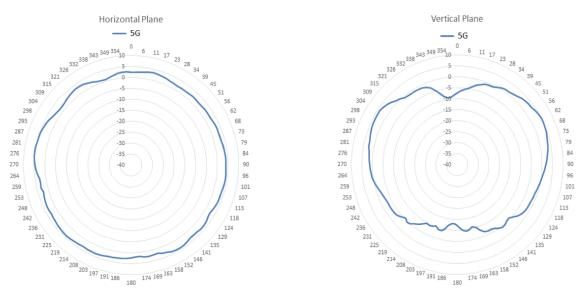


# **IoT Radio Sensitivity**

| Typical Receiver Sensitivity | dBm  |
|------------------------------|------|
| BlueTooth Low Energy         | -90  |
| 802.15.4                     | -100 |

# **AP510i Antenna Radiation Patterns**

5 GHz - Radio 1



# **Radio RF Performance**

2.4 GHz

|               | Maximum Transmit Power (dBm)<br>per Transmit Chain         For mode 1 and 2.         For Dual 5G (mode 3) target power reduces by 2dB. |         | Receiver Sensitivity (dBm)<br>per Receiver Chain<br>For mode 1 and 2.<br>For Dual 5G (mode 3) sensitivity reduces by 2dB. |         |  |  |  |
|---------------|--|---------|---|---------|--|--|--|
|               |  |         |   |         |  |  |  |
|               | AP 510i  | AP 510e | AP 510i   | AP 510e |  |  |  |
| 802.11b       |  |         |   |         |  |  |  |
| 1 Mbps        | 18   | 16      | -97   | -95     |  |  |  |
| 11 Mbps       | 18   | 16      | -89   | -87     |  |  |  |
| 802.11g       |  |         |   |         |  |  |  |
| 6 Mbps        | 18   | 16      | -95   | -93     |  |  |  |
| 54 Mbps       | 16   | 14      | -76   | -74     |  |  |  |
| 802.11n HT20  |  |         |   |         |  |  |  |
| MCS 0         | 18   | 16      | -93   | -91     |  |  |  |
| MCS 7         | 16   | 14      | 75  | -73     |  |  |  |
| 802.11ax HE20 |  |         |   |         |  |  |  |
| MCS 0         | 18   | 16      | -93   | -91     |  |  |  |
| MCS 11        | 14   | 12      | -63   | -61     |  |  |  |

# **Radio RF Performance**

5 GHz

|         | Maximum Transmit Power (dBm)<br>per Transmit Chain |  | Receiver Sensitivity (dBm)<br>per Receiver Chain |   |  |
|---------|--|--|--|---|--|
|         | For moc  | For mode 1 and 2.<br>For Dual 5G (mode 3) target power reduces by 2dB. |  | For mode 1 and 2.<br>For Dual 5G (mode 3) sensitivity reduces by 2dB. |  |
|         | AP 510i  | AP 510e  | AP 510i  | AP 510e   |  |
|         |  | 802.11a  |  |   |  |
| 6 Mbps  | 18   | 16   | -91  | -89   |  |
| 54 Mbps | 17   | 15   | -74  | -72   |  |
|         |  | 802.11n HT20   |  |   |  |
| MCS 0   | 18   | 16   | -91  | -89   |  |
| MCS 7   | 16   | 14   | -72  | -70   |  |
|         |  | 802.11n HT40   |  |   |  |
| MCS 0   | 18   | 16   | -89  | -87   |  |
| MCS 7   | 16   | 14   | -69  | -67   |  |
|         |  | 802.11ac VHT20   |  |   |  |
| MCS 0   | 18   | 16   | -91  | -89   |  |
| MCS 8   | 15   | 13   | -68  | -66   |  |
|         |  | 802.11ac VHT40   |  |   |  |
| MCS 0   | 18   | 16   | -89  | -87   |  |
| MCS 9   | 15   | 13   | -63  | -61   |  |
|         |  | 802.11ac VHT80   |  |   |  |
| MCS 0   | 18   | 16   | -86  | -84   |  |
| MCS 9   | 15   | 13   | -60  | -58   |  |
|         |  | 5 GHz, 802.11ac VHT160   |  |   |  |
| MCS 0   | 18   | 16   | -81  | -79   |  |
| MCS 9   | 15   | 13   | -57  | -55   |  |
|         |  | 5 GHz, 802.11ax HE20   |  |   |  |
| MCS 0   | 18   | 16   | -90  | -88   |  |
| MCS 11  | 14   | 12   | -60  | -58   |  |

# Warranty

As a customer-centric company, Extreme Networks is committed to providing quality products and solutions. In the event that one of our products fails due to a defect, we have developed a comprehensive warranty that protects you and provides a simple way to get your products repaired or media replaced as soon as possible.

# Service and Support

Extreme Networks provides comprehensive service offerings that range from Professional Services to design,deploy and optimization of customer networks, customized technical training, to service and support tailored to individual customer needs.

Please contact your Extreme Networks account executive for more information about Extreme Networks Service and Support. For full warranty terms and conditions please go to: support.extremenetworks.com



http://www.extremenetworks.com/contact

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# **ThunderIT for the REMC SAVE Contract**

ThunderIT offers products and services for REMC SAVE contract customers at a discounted price in accordance to the REMC price list.

## **Overview for the REMC SAVE contract**

REMC SAVE provides large volume contracts for a variety of educational resources, including furniture, school and office supplies, software and digital services, and technology.

The program saves time and money by providing bids compliant with the Michigan Revised School Code that also provides local school districts with the authority to purchase using REMC contracts. The legislation that established REMCs (Michigan Compiled Laws Act 451 Section 380.671), and State Board of Education Rules, enables REMCs to bid on behalf of local school districts and also provide local school districts with the authority to purchase using REMC contracts. All items and vendors are awarded through a sealed bid process by the REMC SAVE Bid Project and approved by the REMC Association.

REMC SAVE is provided as a project of the REMC Association of Michigan for all Michigan schools. REMC SAVE provides large-volume contracts for a variety of educational resources. By using REMC SAVE contracts, Michigan schools have saved more than \$1 billion since 1990. Every dollar saved through REMC SAVE today is one more dollar to invest in instruction tomorrow.

**ThunderIT services the following REMC districts**; REMC 1, REMC 2N, REMC 2C, REMC 2S, REMC 3, REMC 4, REMC 5, REMC 6, REMC 7, REMC 8, REMC 9, REMC 10, REMC 11, REMC 12W, REMC 12E, REMC 13, REMC 14W, REMC 14E, REMC 15, REMC 16, REMC 17, REMC 18S, REMC 18N, REMC 19W, REMC 19E, REMC 20, REMC 21, REMC 22

**ThunderIT services the following REMC customers**; AKIVA HEBREW DAY SCHOOL, BIRNEY MIDDLE SCHOOL, BUSSEY CTR-EARLY CHILDHOOD DEV, DEVRY UNIVERSITY - SOUTHFIELD – CENTRAL, HAMILTON ACADEMY CENTRAL OFFICE, LEONHARD ELEMENTARY SCHOOL, MCINTYRE ELEMENTARY SCHOOL, OAKLAND INTERNATIONAL ACADEMY

Other REMC contract holders include: Inacomp Technical Services Group, Sentinel Technologies, Software Services Group, Insight Direct USA, Information Systems Intelligence, Netech, Secant Technologies, CDW Logistics Inc (CDWG)

# ThunderIT offers a variety of Solutions & Services to meet your every need

## **Digital Workplace**

Transform your digital workplace and empower employees to drive your business forward. We deliver flexible, tailored, end-to-end solutions to keep your workforce engaged and productive. With an innovative approach centered around exceptional user experiences.

### **Smart Spaces**

We provide smart workspace solutions to help you deliver consistent network performance and give guests, employees and students an uninterrupted experience.

### **Secure Network Solutions**

Our security solutions help protect your network and critical data from cybersecurity threats

### Safe Environments

We believe that employee, student, and customer safety is paramount in any environment. That's why our solutions provide a cloud based platform to help you intuitively manage and monitor physical locations to ensure a safe experience for everyone.

### **Next Generation WiFi**

Power new and improved user experiences with our managed wifi solutions, offering faster speeds for enhanced application experience and more capacity for high density indoor and outdoor environments.

### **Remote Work Solutions**

With our remote work solutions, working away from the office is no big deal. Give employees a secure, optimized connection to your entire network from anywhere.

## **Hybrid Workforce**

We provide a seamless hybrid workforce solution that embraces change and operational scale. Give your employees and customers unrivaled experiences with a cloud platform that unifies best-in-class technologies.

# Free Network Evaluation & Demo

ThunderIT offers a FREE Network Evaluation and/or product Demo to help ensure you are well informed and confident when choosing the right Cisco Meraki solution for your needs. During our call we'll architect a custom built Cisco Meraki solution for your business or environment.

# **Migration & Deployment**

ThunderIT offers Migration and Deployment Services for your Cisco Meraki solution. Our experienced team of IT Professionals can configure, deploy and support your products to meet your needs. Our custom solutions ensure maximum efficiency and provide a clear path for your business going forward.

## **Managed Security**

ThunderIT offers the best and most cost-effective solution to lower your risk in a heightened threat environment. Our team of certified Cisco engineers are ready to ensure that your network is secure, and your firewall is optimally configured to defend your business.

## Mobile device management (MDM) Services

Our Mobile Device Management (MDM) solution unifies management of thousands of endpoint devices in a secure cloud platform, driving your organization's mobility initiatives, while maintaining an environment of agility and security.

# Support & Monitoring

ThunderIT offers network support and monitoring services that are designed to fit the needs of every customer.

# FAQs for the REMC SAVE Contract

**Q: Does REMC SAVE meet the legal requirement for competitive bidding?** A: The legislation that established REMCs (Michigan Compiled Laws Act 451 Section 380.671), and State Board of Education Rules, enables REMCs to bid on behalf of local school districts and also provide local school districts with the authority to purchase using REMC contracts. All items are competitively bid by REMC SAVE and awarded by the REMC Association.

**Q: Who can Use REMC SAVE contracts?** A: The following agencies are eligible to purchase using REMC SAVE contracts: PreK-12 Public, Charter (PSA) and Non-Public Schools, Community Colleges, Universities and Colleges, Public Libraries, Museums, State, County, and Local Government Agencies, Educational Non-profit Organizations and Health Care Facilities. Personal purchases at awarded bid pricing are at the discretion of the vendors.

**Q: What is REMC SAVE?** A: REMC SAVE is a free service of the REMC Association for all Michigan schools. There are 3 staff of REMC SAVE, and they conduct all of the bids and maintain vendor contracts. You can ask your local REMC Center questions. Find your local REMC Center by scrolling down the REMC SAVE home screen to view the map for your region or look up by zip code.

**Q: How do I provide feedback?** A: Your local REMC SAVE contact will always listen to any feedback you wish to provide. If you have feedback about the product, scroll down the home screen at remcsave.org and click 'View All Vendors' and you can complete a vendor evaluation form.

**Q:** What if my company wishes to become an awarded vendor? A: Go to vendorcenter.remcbids.org and create an account by clicking Login or Register in the upper right corner. Follow the directions! The only requirement is that you need five Michigan K12 school references. Customers can send their vendor recommendations to their local REMC contact or email remcsave@remc.org

**Q: How are the vendors and products selected?** A: Products and Vendors are awarded through a competitive bid process. REMC SAVE staff analyzes all bids and make recommendations to the REMC SAVE Advisory Committee for award. Once the REMC SAVE Advisory Committee votes on the award recommendations, they are then voted on by the REMC Association Board of Directors for final award.

**Q: Where do I send my order or contact an awarded vendor?** To contact vendors, navigate to the vendor listing by scrolling down the home screen and click 'view all vendors,' or navigate to https://www.remcsave.org/vendors. Click on the vendor name to find their contact information.

**Q: What do I need to include on my purchase order?** Please make sure your purchase order is itemized and includes the REMC item number, the model number/name, the reseller product number (if available), the quantity of each item to be purchased, and the unit price. A quote may be attached, but the purchase order should still be itemized. Sometimes the item numbers for the warranties, accessories, and upgrades are located on the spec sheet, linked from the awarded item page – be sure to include on the Purchase Order.