Extreme™
Customer-Driven Networking

Benefits

Business Alignment

- Support for demanding voice/video/ data applications to enhance mobile worker productivity and convenience

- Role-based grouping of users, devices, and applications to deliver priority, QoS, and security in accordance with business needs

- Seamless roaming across an entire multi-subnet campus without the need for cumbersome client software

- Integrated management, security, and QoS features reduce operating cost and ensure a consistent user experience regardless of location

Operational Efficiency

- Centralized visibility and control accelerates problem resolution, optimize network utilization, and automate management

- Adaptive architecture reduces complexity and optimizes information flow for each application

- Dynamic Radio Management when used for planning and monitoring ensures optimal spectrum coverage resulting in the best end-user quality of experience

- Flexible Client Access optimizes throughput for 802.11ac/n clients in today's mixed ac, n, and a/b/g client environments

Flexible Management Options

- On premise, with hardware or virtual ExtremeWireless Appliance

- ExtremeCloud™ Cloud-Managed Networking Platform

ExtremeWireless™ 3935 i/e Indoor Access Point

Enterprise-Grade, Ultra-High Performance for Demanding High-Density Deployments

Product Overview

The AP3935 is a feature rich 802.11ac (Wave 2) and 802.11abgn indoor access point that delivers enterprise-grade performance and security. Designed to blend into the office, classroom or lecture hall, or large common spaces, the AP3935 is ideal for providing secure 802.11ac and 802.11abgn connectivity for high-density, mission critical environments such as schools, universities, hospitals, indoor arenas, and conference centers.

The AP3935i comes with an integrated eight port antenna array for ease of installation. The AP3935e requires professional installation and includes eight Reverse Polarity Sub-Miniature Version A (RPSMA) antenna connectors supporting both 2.4GHz and 5GHz band antennas. The AP3935 uses 802.3at Power over Ethernet (PoE+) for maximum performance and can operate within an 803.2af power budget with reduced performance. Ethernet ports support transparent power transition (POE Hot-swap). In case of power interruption to one of the ports the AP automatically transitions to the other port. No reboot or state interruption. An optional external power supply is available for deployments that do not support Power over Ethernet.

The AP3935 is built using the latest Wi-Fi technology, including 802.11ac Wave 2, dynamic radio management, and spectrum analysis with interference classification, beamforming, multi-user MIMO, self-forming and self-healing meshing, security, role-based authentication, authorization, and access control. The 4x4:4 platform is capable of delivering up to 2.5 Gbps over-the-air-performance and up to 90,000 packets per second on the wire port.

The AP3935 can be installed directly on a flat surface or on most drop ceilings with the included tool-less drop ceiling bracket. Multiple antenna offerings (e.g., Omni, sector, and panel) ensure that the AP3935e deployment can be optimized to meet any unique coverage or capacity need.

ExtremeCloud Management

A single pane of glass for cloud managing both the wired and wireless components of your network. Zero touch provisioning that significantly reduces deployment.

Specifications

Product Feature	AP3935i/e
General	
High Performance Enterprise Class AP	✓
Number of Radios	2
MIMO Implementation for High Performance 11ac & 11n Throughputs	4x4
Number of Spatial Streams	4
Number of Simultaneous Users (MU-MIMO)	3
Maximum Throughput 2.4GHz Radio	800 Mbps
Maximum Throughput 5GHz Radio	1.733 Gbps
Maximum Throughput per AP	2.532 Gbps
RFC2285 Wire/Wireless Forwarding Rate	90,000 pps
Number of SSIDs Supported per Radio/Total	8/16
Simultaneous Users per Radio/Total	240/480
Simultaneous Voice Calls (802.11b, G.711, R>=78)	30 or Greater
Mode of Operation	Semi-Autonomous
Plug and Play Operation/Zero Touch Deployment	✓
Security and Standards	WPA, WPA2 (AES), 802.11i, 802.1x, IPSec, IKEv2, PKCS #10, X509 DER / PKCS #12, SSL
Multiple Operating Modes	
Intelligent Thin AP	Encryption, Security, QoS and RF management done on AP
Distributed and Centralized Data Paths Within Same SSID	✓
Application based distributed and centralized data paths within same user/device session	✓
Simultaneous RF Monitoring and Client Services	✓
In-Channel WIDS	✓
In-Channel WIPS	✓

Specifications Cont.

Product Feature	AP3935i/e
Dedicated Multi-Channel WIDS (Guardian Mode)	✓
Dedicated Multi-Channel WIPS (Guardian Mode)	✓
Dedicated Multi-Channel RF Spectrum Analysis and Fingerprinting	✓
Locates Devices and Threats via RF Triangulation	✓
Self-Forming and Self-Healing Meshing	✓
Remote Access Point	✓
Hardware-Based, End-to-End Data and Control Plane Encryption	✓
Private and Public Cloud Deployments	✓
SSL	✓
Hybrid Options	
Security Scanning and Serve Clients on Same Radio	✓
Security Scanning and Spectrum Analysis on Same Radio	✓
Spectrum Analysis and Serve Clients on Same Radio	✓
Multi-Channel Dedicated Security Scanning and Spectrum Analysis	✓
Simultaneous Users (MU-MIMO)	3
Radio Characteristics **Max Conductive Power**	
Radio 1 (5GHz)	29 dBm
Radio 2 (2.4GHz)	27 dBm
Max Antenna Gain (Integrated Antenna)	
Radio 1 (5GHz)	5 dBi (AP3935i)
Radio 2 (2.4GHz)	3 dBi (AP3935i)
Adaptive Radio Management	
Dynamic Channel Control	802.11d (ETSI), 802.11h: DFS & TPC support (ETSI)
Efficient Use of the Spectrum with a Multi-Channel Architecture	✓
Automatic Transmit Power and Channel Control	✓
Self-Healing with Coverage Gap Detection	✓
Band Steering with Multiple Steering Modes	✓
Spectrum Load Balancing of Clients	✓
Airtime Fairness	✓
Performance Protection in Congested RF Environments	✓
Fast Transition Roaming (802.11k)	✓
Mitigates Co-Channel Interference with Coordinated Access	✓
Mitigates Adjacent Channel Interference with Optimized Receive Sensitivity	✓
Efficient Reuse of Channels at Shorter Intervals	✓
Mitigates Non 802.11 Interference Without Dedicated Radios	✓
Probe Suppression and Client Link Monitoring	✓
Management Frame Protection (802.11w)	✓
Automatic Discovery of Networks by Pre-Authenticated Devices (802.11u)	✓

Specifications Cont.

Product Feature	AP3935i/e
Quality of Service	
Quality of Service (WMM, 802.11e)	✓
Power Save (U-APSD)	✓
Fast Secure Roaming and Handover Between APs (802.11r)	✓
Pre-Authentication (Pre-Auth)	✓
Opportunistic Key Caching (OKC)	✓
Bonjour/LLMNR/UPnP Identification, Containment and Control	✓
Supports Voice, Video and Data Using the Same SSID	✓
Prioritizes Voice Over Data for Both Tagged and Untagged Traffic	✓
Rate Limiting (Rule and User-Based)	✓
Rule and Role Based QoS Processing	✓
Multicast Rate Control	
Multicast to Unicast Conversion	✓
Adaptable Rate Multicast	✓
Power Save Mode Optimization for Multicast	✓
Wireless Services	
Media Access Protocol	CSMA/CA with ACK

Data Rates	• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
	• 802.11b: 1, 2, 5.5, 11 Mbps
	• 802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps
	• 802.11n: Performance Table below
	• 802.11ac: See 802.11ac Performance Table below
	• Receiver Sensitivity
	• 802.11a:
	  • -92DdBm @ 6Mbps
	  • -77DdBm @ 54Mbps
	• 802.11g:
	  • -91DdBm @ 6Mbps
	  • -78DdBm @ 54Mbps
	• 802.11n: See 802.11n Receiver Sensitivity Table below
	• 802.11ac: See 802.11ac Receiver Sensitivity Table below

Ordering Information

Part Number	Description
Access Points	
31012	WS-AP3935i_FCC (US, Puerto Rico, Colombia) Dual Radio 802.11ac/abgn, 4x4:4 MIMO indoor access point with eight internal antenna array (Requires ExtremeWireless V10.01 or higher; or ExtremeCloud 3.01)
31013	WS-AP3935i-ROW Dual Radio 802.11ac/abgn, 4x4:4 MIMO indoor access point with eight internal antenna array (Requires ExtremeWireless V10.01 or higher; or ExtremeCloud 3.01)
31020	WS-AP3935i-IL (Israel Only) Dual Radio 802.11ac/abgn, 4x4:4 MIMO indoor access point with eight internal antenna array (Requires V10.11.02 or higher)
31014	WS-AP3935e-FCC (US, Puerto Rico, Colombia) Dual Radio 802.11ac/abgn, 4x4:4 MIMO indoor access point with eight reverse polarity SMA connectors for external antenna array (Requires V10.01 or higher, and antennas must be ordered separately)
31015	WS-AP3935e-ROW Dual Radio 802.11ac/abgn, 4x4:4 MIMO indoor access point with eight reverse polarity SMA connectors for external antenna array (Requires V10.01 or higher, and antennas must be ordered separately)
Antennas (Required for AP3935E)	
30702	WS-AI-DQ05120 Indoor, 2.3-2.7/4.9-6.1GHz, 4-feed, 5dBi, 120 degree sector antenna with standard RPSMA-type plug connector
30703	WS-AI-5Q04060 Indoor, 4.9-6.1GHz, 4-feed, 4dBi, 60 degree sector antenna with standard RPSMA-type plug
30704	WS-AI-2Q05060 Indoor, 2.3-2.7GHz, 4-feed, 5dBi, 60 degree sector antenna with standard RPSMA-type plug
30705	WS-AI-DE07025 Indoor 2.4GHz/5GHz, eight feed, 6.5/5.5dBi, 25 degree sector antenna with standard RPSMA-type plug connector
30706	WS-AI-5Q05025 Indoor 5GHz, four feed, 5dBi, 25 degree sector antenna with RPSMA-type plug
30707	WS-AI-DE10055 Indoor 2.4GHz/5GHz, eight feed, 10/6dBi, 55 degree sector antenna with standard RPSMA-type plug connector
30709	WS-ANT-2DIP-4 2.4 GHz Indoor dipole antenna (4-pack)
30710	WS-ANT-5DIP-4 5GHz Indoor Dipole Antenna for 3935e only (4 pack)
WS-AI-DQ04360	WS-AI-DQ04360 Indoor 2.4GHz/4.9-6.1GHz, 4 Feed, 4 dBi, Omni with RPSMA-type plug
Accessories	
30512	Multi-region 12V Indoor External Power Supply for the AP3935i/e
30513	WS-MBI-WALL03 Wall mounting bracket
Mid-Span PoE Devices	
PD-9001GR-ENT	Single port, 1 Gigabit 802.3at PoE Midspan

Data Rates

2.4MHz Radio (802.11n)

Descriptor	Data Streams	HT20		HT40	
		Normal GI	Short GI	Normal GI	Short GI
MCS0	1	6.5	7.2	13.5	15
MCS1	1	13	14.4	27	30
MCS2	1	19.5	21.7	40.5	45
MCS3	1	26	28.9	54	60
MCS4	1	39	43.3	81	90
MCS5	1	52	57.8	108	120
MCS6	1	58.5	65	121.5	135
MCS7	1	65	72.2	135	150
MCS8	2	13	14.4	27	30
MCS9	2	26	28.9	54	60
MCS10	2	39	43.3	81	90
MCS11	2	52	57.8	108	120
MCS12	2	78	86.7	162	180
MCS13	2	104	115.6	216	240
MCS14	2	117	130	243	270
MCS15	2	117	130	243	270
MCS16	3	78	86.7	162	180
MCS17	3	39	43.3	81	90
MCS18	3	58.5	65	121.5	135
MCS19	3	78	86.7	162	180
MCS20	3	117	130	243	270
MCS21	3	156	173.3	324	360
MCS22	3	175.5	195	364.5	405
MCS23	3	195	216.7	405	450
MCS24	4	26	28.9	54	60
MCS25	4	52	57.8	108	120
MCS26	4	78	86.7	162	180
MCS27	4	104	115.6	216	240
MCS28	4	156	173.3	324	360
MCS29	4	208	231.1	432	480
MCS30	4	234	260	486	540
MCS31	4	260	228.9	540	600

Data Rates

5.0MHz Radio (802.11n)

Descriptor	Data Streams	VHT20		VHT40		VHT80	
		Normal GI	Short GI	Normal GI	Short GI	Normal GI	Short GI
MCS0	1	6.5	7.2	13.5	15	29.3	32.5
MCS1	1	13	14.4	27	30	58.5	65.0
MCS2	1	19.5	21.7	40.5	45	87.8	97.5
MCS3	1	26	28.9	54	60	117.0	130.0
MCS4	1	39	43.3	81	90	175.5	195.0
MCS5	1	52	57.8	108	120	234.0	260.0
MCS6	1	58.5	65	121.5	135	263.3	292.5
MCS7	1	65	72.2	135	150	292.5	325.0
MCS8	1	78.0	86.7	162.0	180.0	351.0	390.0
MCS9	1	N/A	N/A	180.0	200.0	390.0	433.3
MCS0	2	13	14.4	27	30	58.5	65.0
MCS1	2	26	28.9	54	60	117.0	130.0
MCS2	2	39	43.3	81	90	175.5	195.0
MCS3	2	52	57.8	108	120	234.0	260.0
MCS4	2	78	86.7	162	180	351.0	390.0
MCS5	2	104	115.6	216	240	468.0	520.0
MCS6	2	117	130	243	270	526.5	585.5
MCS7	2	130	144.4	270	300	585.0	650.0
MCS8	2	156.0	173.3	324.0	360.0	702.0	780.0
MCS9	2	N/A	N/A	360.0	400.0	780.0	866.7
MCS0	3	19.5	21.7	40.5	45	87.8	97.5
MCS1	3	39	43.3	81	90	175.5	195.0
MCS2	3	58.5	65	121.5	135	263.3	292.5
MCS3	3	78	86.7	162	180	351.0	390.0
MCS4	3	117	130	243	270	526.5	585.0
MCS5	3	156	173.3	324	360	702.0	780.0
MCS6	3	175.5	195	364.5	405	N/A	N/A
MCS7	3	195	216.7	405	450	877.5	975.0
MCS8	3	234.0	260.0	486.0	540.0	1053.0	1170.0
MCS9	3	260.0	288.9	540.0	600.0	1170.0	1300.0
MCS0	4	26	28.9	54	60	117	130
MCS1	4	52	57.8	108	120	234	260
MCS2	4	78	86.7	162	180	351	390
MCS3	4	104	115.6	216	240	468	520
MCS4	4	156	173.3	324	360	702	780
MCS5	4	208	231.1	432	480	936	1040
MCS6	4	234	260	486	540	1053	1170
MCS7	4	260	288.9	540	600	1170	1300
MCS8	4	312	346.7	648	720	1404	1560
MCS9	4	N/A	N/A	720	800	1560	1733.3

Receiver Sensitivity

2.4MHz, 11g Radio

Typical Sensitivity at Each RF Chain. Frame (1000-BYTE PDUS) Error Rate <10% at Room Temp. 25°C[1]	
54 Mbps	-80 dBm
48 Mbps	-81 dBm
36 Mbps	-85 dBm
24 Mbps	-88 dBm
18 Mbps	-92 dBm
11 Mbps	-94 dBm
9 Mbps	-95 dBm
6 Mbps	-97 dBm

[1] 802.11G: IEEE STD 802.11G/D8.2-APR 2003 Part 11 Paragraph 19.5.1

Receiver Sensitivity

2.4MHz, 11n Radio

Typical Sensitivity at Each RF Chain. Frame (1000-BYTE PDUS) Error Rate <10% at Room Temp. 25°C[1][2]		
Rate	20MHz (dBm)	40MHz (dBm)
(MSC0)	-96	-94
(MSC1)	-94	-92
(MSC2)	-92	-90
(MSC3)	-88	-86
(MSC4)	-85	-83
(MSC5)	-80	-78
(MSC6)	-79	-77
(MSC7)	-77	-75
(MSC8)	-93	-91
(MSC9)	-91	-89
(MSC10)	-89	-87
(MSC11)	-85	-83
(MSC12)	-82	-80
(MSC13)	-77	-75
(MSC14)	-76	-74
(MSC15)	-74	-72
(MSC16)	-90	-88
(MSC17)	-88	-86
(MSC18)	-86	-84
(MSC19)	-82	-80
(MSC20)	-79	-77
(MSC21)	-74	-72
(MSC22)	-73	-71
(MSC23)	-71	-69
(MSC24)	-87	-85

[1] Should Comply to 802.11N: IEEE P802.11NSEP 2009 Table 20.22

[2] MCS0 to MCS7 Are Measured on the AP3935E HW, MCS8-MCS23 Are Interpolated From the MCS0-MCS7 Measurements

Receiver Sensitivity

2.4MHz, 11n Radio Cont.

Typical Sensitivity at Each RF Chain. Frame (1000-BYTE PDUS) Error Rate <10% at Room Temp. 25°C[12]		
Rate	20MHz (dBm)	40MHz (dBm)
(MSC25)	-85	-83
(MSC26)	-83	-81
(MSC27)	-79	-77
(MSC28)	-76	-74
(MSC29)	-71	-69
(MSC30)	-70	-68

[1] Should Comply to 802.11N: IEEE P802.11NSEP 2009 Table 20.22

[2] MCS0 to MCS7 Are Measured on the AP3935E HW, MCS8-MCS23 Are Interpolated From the MCS0-MCS7 Measurements

Receiver Sensitivity

5.0MHz, 11ac Radio

Typical Sensitivity at Each RF Chain. Frame (1000-BYTE PDUS) Error Rate <10% at Room Temp. 25°C[12]			
Rate	20MHz (dBm)	40MHz (dBm)	80MHz (dBm)
(MSC0,1)	-95	-92	-89
(MSC1,1)	-93	-90	-87
(MSC2,1)	-90	-87	-84
(MSC3,1)	-86	-83	-80
(MSC4,1)	-83	-80	-77
(MSC5,1)	-79	-76	-73
(MSC6,1)	-78	-75	-72
(MSC7,1)	-76	-73	-70
(MSC8,1)	-72	-69	-66
(MSC9,1)	N/A	-67	-64
(MSC0,2)	-92	-89	-86
(MSC1,2)	-90	-87	-84
(MSC2,2)	-87	-84	-81
(MSC3,2)	-83	-80	-77
(MSC4,2)	-80	-77	-74
(MSC5,2)	-76	-73	-70
(MSC6,2)	-75	-72	-69
(MSC7,2)	-73	-70	-67
(MSC8,2)	-69	-66	-63
(MSC9,2)	N/A	-64	-61
(MSC0,3)	-89	-86	-83
(MSC1,3)	-87	-84	-81
(MSC2,3)	-84	-81	-78

[1] Should Comply to 802.11AC

[2] MCS0,1 TO MCS9,1 Are Measured on the AP3935E HW, MCS0,-MCS9 for 2 and 3 SS are Interpolated from the MCS0,1-MCS9,1 Measurements

Receiver Sensitivity
5.0MHz, 11ac Radio Cont.

Typical Sensitivity at Each RF Chain. Frame (1000-BYTE PDUS) Error Rate <10% at Room Temp. 25°C[12]			
Rate	20MHz (dBm)	40MHz (dBm)	80MHz (dBm)
(MSC3,3)	-80	-77	-74
(MSC4,3)	-77	-74	-71
(MSC5,3)	-73	-70	-67
(MSC6,3)	-72	-69	-66
(MSC7,3)	-70	-67	-64
(MSC8,3)	-66	-63	-60
(MSC9,3)	N/A	-61	-58
(MSC0,4)	-86	-83	-80
(MSC1,4)	-84	-81	-78
(MSC2,4)	-81	-78	-75
(MSC3,4)	-77	-74	-71
(MSC4,4)	-74	-71	-68
(MSC5,4)	-70	-67	-64
(MSC6,4)	-69	-66	-63
(MSC7,4)	-67	-64	-61
(MSC8,4)	-63	-60	-57
(MSC9,4)	N/A	-58	-55

[1] Should Comply to 802.11AC

[2] MCS0,1 TO MCS9,1 Are Measured on the AP3935E HW, MCS0,-MCS9 for 2 and 3 SS are Interpolated from the MCS0,1-MCS9,1 Measurements

Receiver Sensitivity
5.0MHz, 11ac Radio Cont.

Typical Sensitivity at Each RF Chain. Frame (1000-BYTE PDUS) Error Rate <10% at Room Temp. 25°C[1]	
54 Mbps	-79
48 Mbps	-80
36 Mbps	-84
24 Mbps	-87
18 Mbps	-91
11 Mbps	-93
9 Mbps	-94
6 Mbps	-96

[1] Should Comply to 802.11A: IEEE STD 802.11A-1999 Part 11 Paragraph 17.3.10.1

3935i Antenna Radiation Patterns 2.4 GHz

Horizontal Radiation Pattern

Vertical Radiation Pattern

3935i Antenna Radiation Patterns 5.0 GHz

Horizontal Radiation pattern
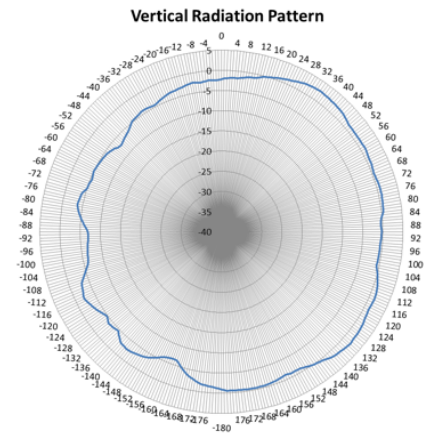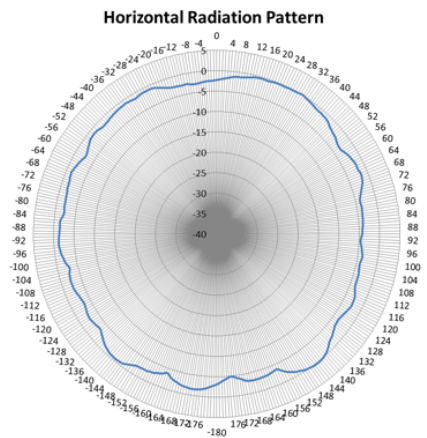
Vertical Radiation Pattern
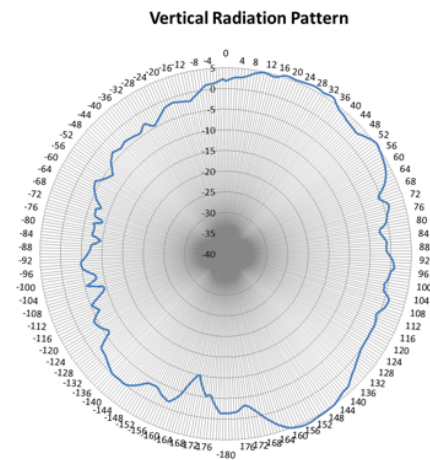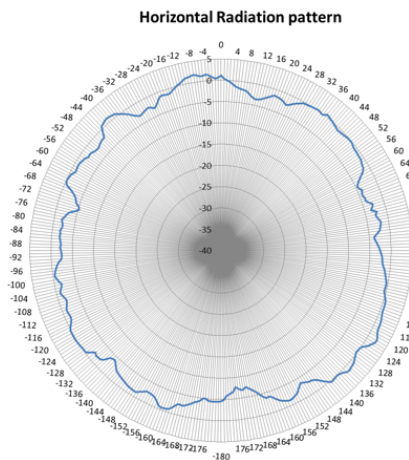
Warranty

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. For full warranty terms and conditions please go to: http://support.extremenetworks.com

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.

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