



Spectralink VIEW Certified Configuration Guide

Extreme Networks - ExtremeWireless

ExtremeWireless C35, V2110, C5210, C5215 with
AP 3825, 3865, 391x, 3935, 3965

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Contents

Chapter 1: Introduction	4
Certified Product Summary.....	4
Known Limitations.....	5
Spectralink References	5
<i>Support Documents</i>	<i>6</i>
<i>White Papers</i>	<i>6</i>
Product Support	7
Chapter 2: Network Topology.....	8
Chapter 3: Extreme Configuration	9
Configuring a New Controller Starting from Factory Defaults.....	9
Installing Software.....	9
Chapter 4: Provisioning the Wireless Controller	10
AP Registration.....	10
Default Settings	10
<i>Modify default AP settings from GUI.....</i>	<i>10</i>
<i>Modify default AP Settings from CLI.....</i>	<i>14</i>
Registered AP Settings	16
<i>Configure registered AP settings from GUI.....</i>	<i>16</i>
<i>Configure registered AP settings from CLI</i>	<i>19</i>
Global Admission Control Thresholds.....	21
<i>Configure Global Admission Control Thresholds from GUI.....</i>	<i>21</i>
<i>Configure Global Admission Control Thresholds from CLI.....</i>	<i>21</i>
Topologies	22
<i>Configure Topologies from the GUI.....</i>	<i>22</i>
<i>Configure Topologies from the CLI.....</i>	<i>23</i>
WLAN Services	24
<i>Configure WLAN Services from the GUI</i>	<i>24</i>
<i>Configure WLAN Services from the CLI</i>	<i>27</i>
DFS Channels	28
<i>Enable DFS channels if desired from GUI.....</i>	<i>28</i>
<i>Enable DFS channels if desired from CLI.....</i>	<i>28</i>

Chapter 1: Introduction

Spectralink's Voice Interoperability for Enterprise Wireless (VIEW) Certification Program is designed to ensure interoperability and high performance between Spectralink Wireless Telephones and wireless LAN (WLAN) infrastructure products.

Certified Product Summary

Manufacturer:	Extreme Networks		
Certified products:	Controller models: C35, V2110, C5210, C215	AP model: 3825, 3865*, 391x, 3935, 3965*, * Outdoor model	
AP Radio(s):	2.4 GHz (802.11b/g/n), 5 GHz (802.11a/n/ac)		
Security:	None, WEP, WPA-PSK, WPA2-PSK, WPA2-Enterprise (EAP-FAST, TLS, and PEAPv0/MSCHAPv2) with OKC and FT (802.11r) roaming		
Network topology:	Bridged at AP		
AP and WLC software versions approved:	ExtremeWireless 10.41.13.0008		

<i>Handset* models tested:</i>	<i>Spectralink Versity 95-Series and 96-Series ***</i>			
Handset radio mode:	802.11b	802.11b/g	802.11bgn	802.11a & 802.11an & 802.11ac
Meets VIEW minimum call capacity per AP**:	10	10	10	12

<i>Handset models incorporated:</i>	<i>Spectralink PIVOT Series</i>			
Handset radio mode:	802.11b	802.11b/g	802.11bgn	802.11a & 802.11an & 802.11ac
Meets VIEW minimum call capacity per AP:	8	8	8	10

<i>Handset models tested: Spectralink 8440/8441/8450/8452/8453 Wireless Telephone</i>				
Handset radio mode:	802.11b	802.11b/g	802.11bgn	802.11a & 802.11an
Meets VIEW minimum call capacity per AP:	8	8	8	10

*Spectralink handset and smartphone models and their OEM derivatives are verified compatible with the WLAN hardware and software identified in the table. Throughout the remainder of this document they will be referred to collectively as “phones” or “handsets”. Versity and PIVOT smartphones may be referred to as “smartphones”.

** Maximum calls tested per the VIEW Certification Test Plan. The certified product may support a higher number of maximum calls

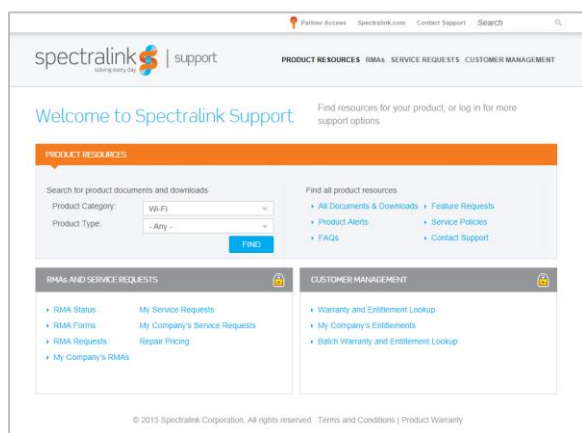
*** Higher maximum calls are for networks with Versity smartphones by themselves. When both 84-Series and Versity smartphones were include, the lower number passed.

Known Limitations

- At the time of this writing, Versity smartphones do not support TSPEC/WMM_AC functions (version 1.4 is the current version).
- The minimum data rate on the 2.4 GHz radio must be set to 11 Mbps for PTT operation.
- Phones manufactured recently or set to factory defaults with a PIVOT version of 2.4 or later or an 84-Series version after 5.3 will have 802.11n disabled. It is important for proper network operations that 802.11n be disabled in the 84-Series and PIVOT products.

Spectralink References

All Spectralink support documents are available at <http://support.spectralink.com>.



To go to a specific product page:

Select the Product Category and Product Type from the dropdown lists and then select the product from the next page. All resources for that particular product are displayed by default under the All tab. Documents, downloads and other resources are sorted by the date they were created so the most recently created resource is at the top of the list. You can further sort the list by the tabs across the top of the list to find exactly what you are looking for. Click the title to open the link.

Support Documents

Spectralink Versity Deployment Guide provides a high-level overview of the deployment process for Spectralink Versity smartphones. This includes the interface with an EMM, the method for getting Versity connected to the wireless LAN, and the interface with the Spectralink Application Management (SAM) server.

PIVOT by Spectralink Configuration Guide The PIVOT Configuration Guide provides detailed information about PIVOT menu items that have been developed specifically for the PIVOT handset.

Spectralink 87-Series Wireless Telephone Deployment Guide The Deployment Guide provides sequential information for provisioning and deploying the handsets. It covers deployment using the SLIC tool and CMS as well as manual deployment.

Spectralink 84-Series Wireless Telephone Administration Guide provides a comprehensive list of every parameter available on Spectralink 84-Series Wireless Telephones.

The *Spectralink 84-Series Deployment Guide* is your essential reference for provisioning and deploying Spectralink 84-Series handsets in any environment.

The *Web Configuration Utility User Guide* explains how to use a web browser to configure the Spectralink 84-Series handsets on a per handset basis.

Best Practices for Deploying Spectralink 87-Series Handsets provides detailed information on wireless LAN layout, network infrastructure, QoS, security and subnets.

White Papers

Spectralink White Papers are available at <http://www.spectralink.com/resources/white-papers>.

For the Spectralink 84-Series Wireless Telephones, please refer to *Best Practices Guide for Deploying Spectralink 84-Series Handsets* for detailed information on wireless LAN layout, network infrastructure, QoS, security and subnets.

For additional details on RF deployment please see *The challenges of ensuring excellent voice quality in a Wi-Fi workplace* and *Deploying Enterprise-Grade Wi-Fi Telephony*.

These White Papers identify issues and solutions based on Spectralink's extensive experience in enterprise-class Wi-Fi telephony. It provides recommendations for ensuring that a network environment is adequately optimized for use with Spectralink Wireless Telephones.

Product Support

For additional support, contact Enterasys Extreme Networks using one of the following methods:

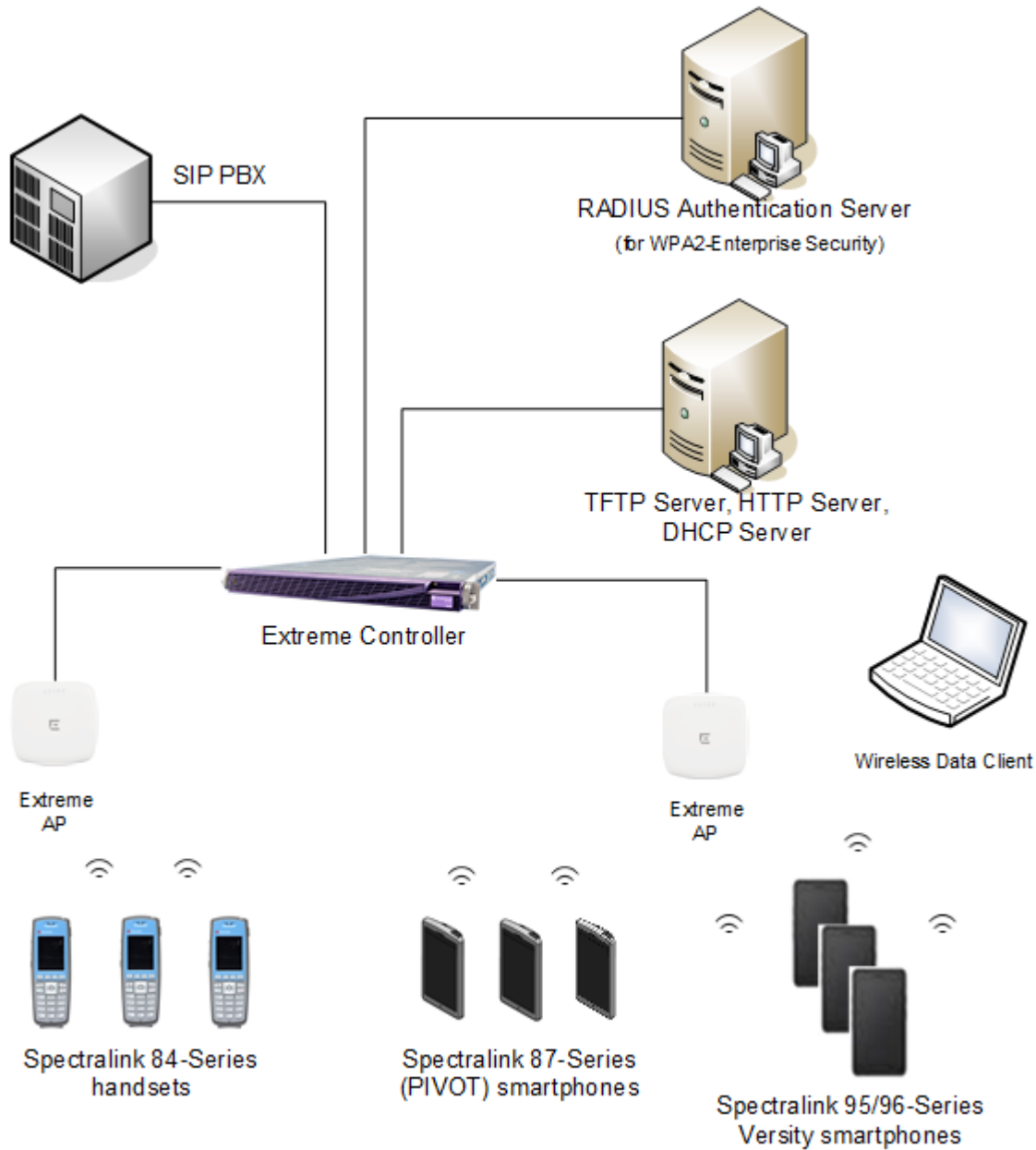
World Wide Web <http://www.extremenetworks.com/support>

Phone 1-800-872-8440 (toll-free in U.S. and Canada)

For the Extreme Networks Support toll-free number in your country:

<http://www.extremenetworks.com/support/contact>

Chapter 2: Network Topology



Note: Example configuration shown

This is a modified diagram and not all components are shown for every system type.

Chapter 3: Extreme Configuration

This document will focus on those places where the configuration needed to support Spectralink wireless handsets differs from the factory default configuration. Where the configuration is typical, Extreme reference documents are employed. Note that all hyperlinks to documents provided below may refer to older versions as the documents are updated. To guarantee that the latest information is being accessed, find the document name on the extremenetworks.com site for the installed software version.

Configuring a New Controller Starting from Factory Defaults

The [ExtremeWireless™ Getting Started Guide](#) provides information for setting up the controller models from factory defaults. It has sections for:

- Accessing the Wireless Appliance for the First Time – reaching by cli or the browser and using the initial Configuration Wizard.
- Wireless Appliance Configuration – includes how to apply the activation license key(s).

The [ExtremeWireless™ CLI Reference Guide](#) describes how to perform a factory reset from the CLI.

Installing Software

Upgrading the controller to a new image is discussed in the Upgrading the Wireless Convergence Software section of the [ExtremeWireless™ Maintenance Guide](#).

Chapter 4: Provisioning the Wireless Controller

AP Registration

The Configuring the ExtremeWireless APs section of the [ExtremeWireless™ User's Guide](#) describes how to discover and setup default radio properties for APs.

There are certain AP radio properties that must be set for proper operation with Spectralink handsets. These configurations include the following:

- Radio 1 (5Ghz) mode: a/n/ac
- Radio 2 (2.4 Ghz) mode: g/n
- Minimum Basic Rate: 12 Mbps
- Protection Type: CTS only
- Multicast to Unicast delivery: Disabled (To support PTT)
- DTIM period: 1 (To support PTT)
- Multicast Filter (To support PTT)

Default Settings

Modify default AP settings from GUI

As the Wireless APs discover and register with the controller, they inherit the properties of the default Wireless AP setting. Unregistered APs are added with default settings.

You can modify the system's AP default settings, and the system will apply these default settings on new AP's as they register. This section provides steps to configure the default settings that will apply to AP's during registration.

- 1 Navigate to **AP> Global> Default Settings**.
- 2 Choose the tab representing the model of the AP at the top.
Spectralink 84-Series and PIVOT handset are legacy devices. Set the **Radio Mode** to **a/n/ac**. (default setting is ac-strict for radio 1 and bgn for radio 2)

The screenshot shows the configuration page for AP3935 FCC. The left sidebar contains navigation options: APs, Global (selected), Maintenance, Registration, Client Management, and Default Settings. The main content area is divided into two sections: AP Properties and Radio Settings.

AP Properties [Hide]

- LLDP: Enabled
- Announcement Interval [Seconds]: 30
- Announcement Delay [Seconds]: 2
- Time To Live [Seconds]: 120
- Country: United States

Radio Settings [Hide]

	Radio 1	Radio 2
Admin Mode:	On	On
Radio Mode:	a/n/ac	g/n
Channel Width:	40MHz	20MHz
RF Domain:	MyDomain	MyDomain
Auto Tx Power Ctrl:	Off	Off
Max Tx Power:	18 dBm	18 dBm
Min Tx Power:	0 dBm	8 dBm
Auto Tx Power Ctrl Adjust:	0 dB	0 dB
Channel Plan:	All Non-DFS-Channel	Auto

Buttons: Advanced..., Save Settings



Note: Handsets default to 802.11n disabled

PIVOT handsets with 2.4+ versions and 84-Series handsets manufactured with 5.3+ will default to 802.11n disabled. In other words, they will advertise as legacy a/b/g devices. They **must** have 802.11n disabled for best network interoperability.

Modify DFS channels

Spectralink phones can operate on DFS channels if desired. In this menu, set the **Channel Plan** to **All Channels**.

- 1 Click the **Advanced** button.
- 2 Set **DTIM** to 1 (to support PTT), **Min Basic Rate** to 12 Mbps. Ensure that **Protection Type** is set to CTS Only for both **Radio Settings** and **11n Radio Settings**.
- 3 Ensure that **Multicast to Unicast** delivery is set to Disabled if the Push-to-Talk feature is desired on the Spectralink handsets.

Advanced ? X

AP Properties [Hide]

Poll Timeout [Seconds]:

Secure Tunnel: ▼

Secure Tunnel Lifetime [hours]:

Remote Access: ▼

Location-based Service: ▼

Maintain client sessions in event of poll failure: ▼

Restart service without controller: ▼

Use broadcast for disassociation: ▼

IP Multicast Assembly: ▼

Balanced Channel List Power: ▼

LED: ▼

Radio Settings [Hide]

	Radio 1	Radio 2
DTIM:	<input type="text" value="1"/>	<input type="text" value="1"/>
Beacon Period [ms]:	<input type="text" value="100"/>	<input type="text" value="100"/>
RTS/CTS [Bytes]:	<input type="text" value="2346"/>	<input type="text" value="2346"/>
Frag. Threshold [Bytes]:	<input type="text" value="2346"/>	<input type="text" value="2346"/>
Dynamic Channel Sel.:	<input type="text" value="Monitor Mode"/> ▼	<input type="text" value="Monitor Mode"/> ▼
DCS Noise Threshold [dBm]:	<input type="text" value="-80"/>	<input type="text" value="-80"/>
DCS Chl. Occupancy Th. [%]:	<input type="text" value="100"/>	<input type="text" value="100"/>
DCS Update Period [Minutes]:	<input type="text" value="5"/>	<input type="text" value="5"/>
Bluetooth:	<input type="text" value="Disabled"/> ▼	<input type="text" value="Disabled"/> ▼
Microwave:	<input type="text" value="Disabled"/> ▼	<input type="text" value="Disabled"/> ▼

Advanced
?
X

Cordless Phone:	Disabled	Disabled
Constant Wave:	Disabled	Disabled
Video Bridge:	Disabled	Disabled
Interference Wait time:	10	10
Preamble:	Long	Long
Protection Mode:	None	Auto
Protection Rate:	1	11
Protection Type:	CTS Only	CTS Only
Min Basic Rate:	12 Mbps	12 Mbps
Probe Suppression:	Disabled	Disabled
Force Disassociate:	Disabled	Disabled
RSS Threshold [dBm]:	-90	-90
Max % of non-unicast traffic per Beacon period:	100	100
Optimized Multicast for power save:	Disabled	Disabled
Adaptable rate for Multicast:	Disabled	Disabled
Multicast to Unicast delivery:	Disabled	Disabled

11n Radio Settings [Hide]

Guard Interval:	Short	Short
Protection Mode:	Auto	Auto
Protection Type:	CTS only	CTS only
Extension Channel Busy Threshold:	50	50
Aggregate MSDUs:	Disabled	Disabled

Aggregate MPDUs:	Enabled	Enabled
Aggregate MPDU Max Length:	1048575	65535
Agg. MPDU Max # of Sub-frames:	30	30
ADDBA Support:	Enabled	Enabled
LDPC:	Enabled	Enabled
STBC:	Disabled	Disabled
TXBF:	MU_MIMO	Disabled

Close

Modify default AP Settings from CLI



Note: CLI command key

In the commands below, the bold text indicates text that is entered by the user.

A larger font and bold type indicate that some navigation has been omitted.

Drop down CLI hierarchy to AP model context for radio default settings:

```
EWC.extremenetworks.com# ap defaults 3935FCC radio1
```

Configure radio mode default settings to support 802.11n clients on Radio 1 and Radio 2

View current setting:

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# show mode
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# radio mode ac-strict
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# show mode
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# radio mode bg
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# exit
```



Note: CLI command key

In the commands below, the bold text indicates text that is entered by the user.

A larger font and bold type indicate that some navigation has been omitted.

Configure radio mode setting:



Note: 84-Series and PIVOT smartphones are not 802.11ac

Some Spectralink phone models are not 802.11ac devices, so ac-strict radio mode will not work.

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# mode anac
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# apply
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio2
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# mode gn
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# apply
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# exit
```

View current minimum basic rate default setting:

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# show minbrate
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# minbrate 6
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio2  
EWC.extremenetworks.com:ap:defaults:3935FCC# show minbrate  
EWC.extremenetworks.com:ap:defaults:3935FCC# minbrate 6  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# exit
```

Configure minimum basic rate default setting on Radio 1 and Radio 2:

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio1  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# minbrate 12  
EWC.extremenetworks.com:ap:defaults:3935FCC# apply  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio2  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# minbrate 12  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# apply  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# exit
```

Configure DTIM default settings on Radio 1 and Radio 2 (to support PTT)

View current DTIM default settings:

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# show dtim  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# dtim 5  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# show dtim  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# dtim 5  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# exit
```

Configure DTIM default settings on Radio 1 and Radio 2:

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio1  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# dtim 1  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# apply  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio2  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# dtim 1  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# apply  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# exit
```

Disable Multicast to Unicast default settings on Radio 1 and Radio 2

View current default multicast to unicast setting:

```
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# show mcast2ucast  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# mcast2ucast disabled  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio2  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# show mcast2ucast  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# mcast2ucast disabled  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# exit
```

Configure multicast to unicast default settings:

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio1  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# mcast2ucast disabled  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# apply  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio1# exit
```

```
EWC.extremenetworks.com:ap:defaults:3935FCC# radio2  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# mcast2ucast disabled  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# apply  
EWC.extremenetworks.com:ap:defaults:3935FCC:radio2# end
```

Registered AP Settings

Configure registered AP settings from GUI

AP's that are already registered with the controller can be configured individually or using the AP multi-edit GUI configuration. This section provides steps to configure registered APs using multi-edit.

- 1 Navigate to **AP> APs**.
- 2 Select the APs to be configured.
- 3 Select Multi Edit in the Action dropdown.

The screenshot shows the Spectralink VIEW interface. On the left, there is a sidebar with 'APs' selected, and sub-sections for 'Local', 'Global', and 'Load Groups'. The main area displays a table of APs with columns for Name, Model, Site, Location, SW Version, and Status. The table contains 5 rows, with the last two rows selected. Below the table, there is a search bar and a status indicator 'Showing: 5 rows, Local: 5'. At the bottom, there is a navigation bar with 'Actions', 'Radio 1 Actions', 'Radio 2 Actions', 'New', and 'Delete' buttons. The 'Actions' menu is open, showing options like 'Image Upgrade', 'Multi Edit', 'Manage Certificates', 'Approve', 'Release', 'Pending', 'Reboot', 'Set Country', and 'Apply WLAN'. The status bar at the bottom right shows 'Software: 10.11.04.0008 | Admin Users: 3' and '© 2006-2016 Extreme Networks. All Rights Reserved.'

Name	Model	Site	Location	SW Version	Status
AP3715e-01	AP3715e			10.11.04.0008	Local
AP38251-02	AP3825i			10.11.04.0008	Local
AP3825e-02	AP3825e			10.11.04.0008	Local
AP3935e-01	AP3935e-FCC			10.11.04.0008	Local
AP3935i-02	AP3935i-FCC			10.11.04.0008	Local

- 4 In the Multi Edit window select the following:
 - Radio 1 Radio Mode: a/n/ac
 - Radio 2 Radio Mode: g/n
 - Both Radios DTIM: 1 (If using PTT feature)
 - Both Radios Min Base Rate: 12 Mbps
 - Both Radios Multicast to Unicast Delivery: Disabled
 - Both radios Protection Type: CTS Only
- 5 Click Apply

Multi Edit
?
✕

Radio Settings [Hide]

	Radio 1	Radio 2
Admin Mode:	-	-
Radio Mode:	a/n/ac	g/n
Channel Width:	-	-
DTIM:	1	1
Beacon Period (ms):		
RTS/CTS (Bytes):		
Frag. Threshold (Bytes):		
RF Domain:		
Channel:	-	-
Auto Tx Power Ctrl:	-	-
Max Tx Power:	-	-
Min Tx Power:	-	-
Auto Tx Power Ctrl Adjust:		
Channel Plan:	-	-
Dynamic Channel Sel.:	-	-
DCS Noise Threshold (dBm):		
DCS Chl. Occupancy Th. [%]:		
DCS Update Period (Minutes):		
Bluetooth:	-	-
Microwave:	-	-
Cordless Phone:	-	-
Constant Wave:	-	-
Video Bridge:	-	-
Interference Wait time:		
Preamble:	-	-
Protection Mode:	-	-
Protection Rate:	-	-
Protection Type:	-	-
Min Basic Rate:	12 Mbps	12 Mbps
Probe Suppression:	-	-
Force Disassociate:	-	-
RSS Threshold (dBm):		
Max % of non-unicast traffic per Beacon period:		
Optimized Multicast for power save:	-	-
Adaptable rate for Multicast:	-	-
Multicast to Unicast delivery:	Disabled	Disabled

11n Radio Settings [Hide]

Guard Interval:	-	-
Protection Mode:	-	-
Protection Type:	CTS only	CTS only

Apply Close

Configure registered AP settings from CLI



Note: CLI command key

In the commands below, the bold text indicates text that is entered by the user.



Admin Tip

Registered AP's are individually configurable in the CLI using their serial number. Multi-Edit is not currently supported from CLI. It is recommended to use the GUI to configure multiple APs at the same time.

Drop down CLI hierarchy to AP context:

```
EWC.extremenetworks.com# ap
```

View list of registered APs and corresponding serial numbers:

```
EWC.extremenetworks.com:ap# show
serial 1318001808030000 AP3715e-01 AP3715e
serial 14122504085A0000 AP3825e-02 AP3825e
serial 14364466085D0000 AP3825i-02 AP3825i
serial 1546Y-1000900000 AP3935e-01 AP3935e-FCC
serial 1548Y-1285400000 AP3935i-02 AP3935i-FCC
```

Drop down CLI hierarchy to the specific AP and Radio context by entering serial number of AP and radio:

```
EWC.extremenetworks.com:ap:1546Y-1000900000 radio1
```

1 Configure radio mode settings to support 802.11n clients

View current radio mode setting:

```
EWC.extremenetworks.com:ap:1546Y-1000900000 radio1# show mode
EWC.extremenetworks.com:ap:1546Y-1000900000 radio1# radio mode ac-strict
```

```
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# show mode
EWC.extremenetworks.com:ap:1546Y-1000900000 radio2# radio mode gn
```

2 Configure radio mode setting on Radio 1 and radio 2

```
EWC.extremenetworks.com:ap:1546Y-1000900000#radio1
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# mode anac
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# apply
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# exit
EWC.extremenetworks.com:ap:1546Y-1000900000# radio2
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# mode gn
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# apply
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# exit
```

3 Set minimum basic rate setting to 12 Mbps on both radios

View current minimum basic rate setting:

```
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# show minbrate
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# minbrate 6
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# exit
```

```
EWC.extremenetworks.com:ap:1546Y-1000900000# radio2
EW.extremenetworks.com:ap:1546Y-1000900000:radio2# show minbrate
EW.extremenetworks.com:ap:1546Y-1000900000:radio2 minbrate 6
```

Configure minimum basic rate setting on Radio 1 and Radio 2:

```
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# minbrate 12
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# apply
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# exit
EWC.extremenetworks.com:ap:1546Y-1000900000# radio2
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# minbrate 12
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# apply
```

4 Set DTIM to 1 on both radios

```
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# dtim 1
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# apply
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# exit
EWC.extremenetworks.com:ap:1546Y-1000900000# radio2
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# dtim 1
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# apply
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# end
```

5 Disable multicast to unicast on both radios:

View current multicast to unicast setting:

```
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# show mcast2ucast
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# mcast2ucast disabled
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# exit
```

```
EWC.extremenetworks.com:ap:1546Y-1000900000# radio2
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# show mcast2ucast
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# mcast2ucast disabled
```

Configure multicast to unicast setting:

```
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# mcast2ucast
disabled
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# apply
EWC.extremenetworks.com:ap:1546Y-1000900000:radio1# exit
```

```

EWC.extremenetworks.com:ap:1546Y-1000900000# radio2
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# mcast2ucast disabled
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# apply
EWC.extremenetworks.com:ap:1546Y-1000900000:radio2# end

```

Global Admission Control Thresholds

Configure Global Admission Control Thresholds from GUI

Admission Control ensures that call quality will be guaranteed for a certain number of calls. In Extreme, there is only one set of percentages across all types of radios. For the best compromise, the setting shown below ensures 8 calls on bgn radio and 10 or more calls on ac radio.



Note: 84-Series and PIVOT implement WMM_AC (Admission Control)

The 84-Series and PIVOT have WMM_AC (Admission Control). At the time of this writing, Versity smartphones do not support TSPEC/WMM_AC functions (version 1.4 is the current version). If a network uses admission to control to ensure quality for the 84-Series and PIVOT calls, the Versity calls will be sent at video calls instead of voice class. In testing, this was not shown to impair voice quality.

Navigate to **VNS>Global>Wireless QOS**.

For the Max Voice (VO) BW for roaming streams, enter **5%**.

For the Max Voice (VO) BW for new streams, enter **20%**.

Configure Global Admission Control Thresholds from CLI

Enter Admission Control Thresholds

- 1 Drop down CLI hierarchy to admissioncontrol context:

```
EWC.extremenetworks.com# vnsmode adminctr
```

- 2 Enter voice initial association and reassociation percentages:

```
EWC.extremenetworks.com# max-voice-reassoc 5
```

```
EWC.extremenetworks.com# max-voice-assoc 20
```

Topologies

Configure Topologies from the GUI

Spectralink handsets have only been tested with the **Bridged at AP (B@AP)** topology.

Follow the directions in the Configuring Topologies in the [ExtremeWireless™ User's Guide](#).

Special settings for Spectralink handsets in the Topologies area are as follows:

- 1 Navigate to **VNS> Topologies> Bridged at AP untagged** for the VLAN set up to support the handsets.
- 2 On the **General** tab, ensure that **ARP Proxy** is checked.

The screenshot displays the configuration interface for a topology named "Bridged at AP untagged". The interface is divided into two main sections: "General" and "Multicast Filters".

- General Tab:**
 - Core:** Name: Bridged at AP untagged; Mode: Bridge Traffic Locally at AP.
 - Layer 2:** VLAN Setting: VLAN ID: 4093 (1 - 4094). Radio buttons for "Untagged" and "Tagged" are present, with "Untagged" selected. The "ARP Proxy" checkbox is checked.
- Multicast Filters Tab:**
 - Layer 3:** A checkbox is present and unchecked.
 - Layer 3 - IPv4:** Mask (optional): [Empty text box].

At the bottom of the configuration area, there are buttons for "New", "New Group", "Delete", and "Save". On the left side, a navigation pane shows the hierarchy: Topologies > Bridged at AP untagged.

- 3 Open the **Multicast Filters** tab.
- 4 In the **Define groups** section, scroll to **Spectralink Mcst (224.0.1.116)** and click on **Add**.
- 5 Ensure that **Multicast bridging** is checked.

Configure Topologies from the CLI

Enable Arp Proxy on the topology



Note: CLI command key

In the commands below, the bold text indicates text that is entered by the user.

- 1 Drop down CLI hierarchy to topology layer 2 context:

```
EWC.extremenetworks.com# topology "Bridged at AP untagged" l2
```



Admin Tip: Changing the topology name

CLI command is "topology <topology name> l2". If configuring a user created topology specify the name of the topology in place of the system created topology "Bridged at AP untagged".

- 2 View current setting:

```
EWC.extremenetworks.com:topology:Bridged at AP untagged:l2# show arp-proxy
```

```
EWC.extremenetworks.com:topology:Bridged at AP untagged:l2# ARP proxy: disable
```

- 3 Enable arp proxy:

```
EWC.extremenetworks.com:topology:Bridged at AP untagged:l2# arp-  
proxy enable  
EWC.extremenetworks.com:topology:Bridged at AP untagged:l2# apply
```

Configure multicast to support PTT

Drop down CLI hierarchy to topology layer 2 multicast context:

```
EWC.extremenetworks.com# topology:Bridged at AP untagged:l2#  
multicast  
  
EWC.extremenetworks.com# topology:Bridged at AP  
untagged:l2:multicast: show  
EWC.extremenetworks.com# topology:Bridged at AP untagged:l2:multicast: Multicast  
support: disable  
EWC.extremenetworks.com:topology: Bridged at AP untagged:l2:multicast#  
Multicast support: enable  
EWC.extremenetworks.com:topology:Bridged at AP untagged:l2:multicast# apply  
EWC.extremenetworks.com:topology:Bridged at AP untagged:l2:multicast# end
```

WLAN Services

Configure WLAN Services from the GUI

The WLAN Services may be set up as described in the Configuring WLAN Services section in the [ExtremeWireless™ User's Guide](#).

These settings are required for all WLAN Services which are defined.

- 1 Navigate to **VNS>WLAN Services** and click on the name of the services you have defined.
- 2 Click on the **QoS** tab.
- 3 Check the **WMM** and **U-APSD** radio buttons.



Admin Tip

If using WMM_AC, check the button for **Use Global Admission Control for Voice (VO)**. WMM_AC ensures bandwidth for calls by making the calls roam to another AP if there is not enough bandwidth.

New... Global Sites Virtual Networks WLAN Services data VPEAP VPSK2 Roles Classes of Service Topologies	WLAN: VPEAP				
	WLAN Services		Privacy	Auth & Acct	QoS
	Wireless QoS				
	<input checked="" type="checkbox"/> WMM				
	<input type="checkbox"/> 802.11e				
	<input type="checkbox"/> Turbo Voice				
	<input checked="" type="checkbox"/> U-APSD				
	Admission Control				
	<input checked="" type="checkbox"/> Use Global Admission Control for Voice (VO)				
	<input type="checkbox"/> Use Global Admission Control for Video (VI)				
<input type="checkbox"/> Use Global Admission Control for Best Effort (BE)					
<input type="checkbox"/> Use Global Admission Control for Background (BK)					
UL Policer Action: <input type="text" value="Do nothing"/>					
DL Policer Action: <input type="text" value="Do nothing"/>					
* Global admission controls are configured through Global Settings					
<input type="button" value="Advanced"/>					
<input type="button" value="New"/>		<input type="button" value="Delete"/>		<input type="button" value="Save"/>	



Note: Versity smartphones do not support WMM_AC

At the time of this writing, Versity smartphones do not support TSPEC/WMM_AC functions (version 1.4 is the current version). If it is turned on in a network to provide better service for PIVOT and 84-Series phones, Versity phone calls will be at video class.

For WLAN's supplying Enterprise-level security Privacy

Select the following settings:

- 1 Navigate to **VNS>WLAN Services** and click on the name of the services you have defined.
- 2 Click on the **Privacy** tab.
- 3 For PEAP, EAP-TLS, or EAP-FAST security, click the **WPA** radio button.
- 4 Select the **WPA v.2** radio button.
- 5 Select **AES only** from the **Encryption** dropdown list.
- 6 Select **Opportunistic Keying and Pre-auth** from the **Key Management Options** dropdown list.

- 7 Select a large value for the **Broadcast re-key interval**. **3600** is recommended. If a re-keying operation occurs during a call, there will be an audible drop in the audio of a few seconds.
- 8 Ensure that **Group Key Power Save Retry** is unchecked, **Management Frame Protection** is enabled, and **Fast Transition** is checked.



Note: Management Frame Protection is supported by Versity

Versity handsets support Management Frame Protection (802.11w). Management Frame Protection must be disabled or set to Enabled but not required for all Privacy settings (security types). PIVOT and 84-Series handsets do not support Management Frame Protection. Extreme, however, when set to Enabled does check if it is supported in the client before using it. Enabled is the choice compatible with all models of handset.



Note: Fast Transition supported by Versity

Fast Transition (802.11r) is supported by Versity. Extreme advertises both Opportunistic Keying (OKC) and FT even when Fast Transition is checked, allowing one SSID to be compatible with all models of handset.

The screenshot shows the configuration page for a WLAN service named 'VPEAP'. The left sidebar contains a navigation menu with options: New..., Global, Sites, Virtual Networks, WLAN Services (selected), data, VPEAP, VPSK2, Roles, Classes of Service, and Topologies. The main content area is titled 'WLAN: VPEAP' and has four tabs: WLAN Services, Privacy (selected), Auth & Acct, and QoS. Under the Privacy tab, the following settings are visible:

- Security type: None, Static Keys (WEP), Dynamic Keys (WEP), WPA, WPA - PSK
- WPA v.1: WPA v.1, Encryption: TKIP only
- WPA v.2: WPA v.2, Encryption: AES only
- Key Management Options: Opportunistic Keying & Pre-auth
- Broadcast re-key interval: Broadcast re-key interval: 3600 (30 - 86400 seconds)
- Group Key Power Save Retry: Group Key Power Save Retry
- Management Frame Protection: Management Frame Protection: Enabled
- Fast Transition: Fast Transition

A red note at the bottom of the configuration area states: "Note: using WEP or WPAv1 privacy will limit 11n and 11ac performance to legacy AP rates." At the bottom of the page are buttons for 'New', 'Delete', and 'Save'.

Configure WLAN Services from the CLI



Note: CLI command key

In the commands below, the bold text indicates text that is entered by the user.

Enable WMM on Wireless LAN

Drop down CLI hierarchy to Wireless LAN QoS Policy context:

```
EWC.extremenetworks.com# wlans vPEAP qos-policy
```

1 View current WMM setting:

```
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# show wmm  
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# WMM: enable
```

2 Enable WMM on Wireless LAN:

```
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# wmm enable  
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# apply
```

Enable U-APSD on Wireless LAN

1 View current U-APSD setting:

```
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# show uapsd  
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# Enable U-APSD: disable
```

2 Enable U-APSD:

```
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# uapsd enable  
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# apply  
EWC.extremenetworks.com:wlans:vPEAP:qos-policy# end
```

Enable Opportunistic Keying and Pre-authentication and Fast Transition

(On WLANs with Enterprise-level 802.1x security)

1 Drop down CLI hierarchy to Wireless LAN privacy context:

```
EWC.extremenetworks.com# wlans vPEAP priv
```



Admin Tip

CLI command is “wlans <wireless LAN name> priv”

2 View current Key Management settings:

```
EWC.extremenetworks.com:wlans:vPEAP:priv# show wpa-v2-key-mgmt  
EWC.extremenetworks.com:wlans:vPEAP:priv# Key Management Options: enable  
Key management Options:pre-auth
```

```
EWC.extremenetworks.com:wlans:vPEAP:priv# wpa-v2-key-mgmt both
EWC.extremenetworks.com:wlans:vPEAP:priv# fast-transition enable
EWC.extremenetworks.com:wlans:vPEAP:priv# apply
EWC.extremenetworks.com:wlans:vPEAP:priv# end
```

Enable Management Frame Protection on any WPA WLAN

Drop down CLI hierarchy to Wireless LAN privacy context:

```
EWC.extremenetworks.com# wlans vPEAP priv
EWC.extremenetworks.com:wlans:vPEAP:priv# mfp enable
```

DFS Channels

Enable DFS channels if desired from GUI

Ensure that 802.11h is turned on as in the following:

- 1 Navigate to **VNS>WLAN Services** and click on the name of the services you have defined.
- 2 Click on the **WLAN Services** tab.
- 3 Click on the **Advanced** button.
- 4 Ensure that **Enable 11h support** is checked.

Enable DFS channels if desired from CLI

- 1 Drop down CLI hierarchy to Wireless LAN rf context:

```
EWC.extremenetworks.com# wlans vPEAP qos-policy
```

- 2 View current WMM setting:

```
EWC.extremenetworks.com:wlans:vPEAP:rf# show 11h-support
Enable 11h support: enable
```

- 3 Enable 802.11h on Wireless LAN:

```
EWC.extremenetworks.com:wlans:vPEAP:rf# 11h-support enable
EWC.extremenetworks.com:wlans:vPEAP:rf# apply
```

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