Meru AP300

Hardware Installation Guide
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About This Guide

This guide describes the various options for configuring the Meru AP300 and the wireless LAN. The architecture and fundamental operations of system are described.

Audience

This guide is intended for network administrators configuring and maintaining the. Familiarity with the following concepts is helpful when configuring the Meru AP300:

- Network administration, including:
  - Internet Protocol (IP) addressing and routing
  - Dynamic Host Configuration Protocol (DHCP)
  - Configuring Layer 2 and Layer 3 switches (if required by your switch)
- IEEE 802.11n (Wi-Fi) concepts, including:
  - ESSIDs
  - WEP
- Network Security (optional)
  - WPA
  - 802.1X
  - RADIUS
  - X.509 certificates

Other Sources of Information

Additional information is available in the following Meru publications and external references.

Publications

- Meru System Director 3.4 Release Notes
- Meru System Director 3.4.SR3 Release Notes
- Meru System Director Command Reference
- Meru System Director Getting Started Guide
- Meru System Director Configuration Guide
Guide to Typographic Conventions

External References


Guide to Typographic Conventions

This guide uses the following typographic conventions in paragraph text to help you identify information:

**Bold text**
Identifies commands and keywords in syntax descriptions that are entered literally.

**Italic text**
Used for new terms, emphasis, and book titles; also identifies arguments for which you supply values in syntax descriptions.

**Courier font**
Identifies file names, folder names, computer screen output, and text in syntax descriptions that you are required to type.

**Ctrl-**
Denotes that the Ctrl key should be used in conjunction with another key, for example, Ctrl-D means hold down the Ctrl and press the D key. Keys are shown in capitals, but are not case sensitive.

**Note:** Provides extra information, tips, and hints regarding the topic

**Caution!** Identifies important information about actions that could result in damage to or loss of data, or could cause the application to behave in unexpected ways

**Warning!**
Syntax Notation

In example command syntax descriptions and examples, the following text elements and punctuation are used to denote user input and computer output for the command. In general, *Courier font* is used for command input and output at the command line; **bold** indicates required text and *italics* indicates values that are to be replaced.

**bold**
- Required command, keywords, and punctuation.

*italic*
- Arguments or file names where you substitute a value.

**no**
- The optional no form of the command disables the feature or function.

[ ]
- Optional elements are enclosed by square brackets.

{ }
- Braces indicate that one of the enclosed elements must be used.

|
- Choices among elements are separated by vertical bars.

[{}]
- A required choice within an optional element.

... 
- The preceding argument can be repeated.

The following figure shows a sample of syntax notation.

```
[no] action target {keyword|keyword} [argument ...]
```

- Choose between the enclosed elements
- One or more repeated values
- Keyword or command within a submode.
- Command or action. In some cases, *action* takes you to another command mode.
- The optional no form disables the command; without the no, enables or re-enables.
Syntax Notation
Chapter 1
AP300 Series Introduction

The AP300 Access Point delivers high performance, full-speed, draft 2.0 compatible 802.11n connectivity while simultaneously supporting legacy 802.11a/b/g devices. The AP300 Access Points are supported by System Director Release 3.4.SR3.

Figure 1: AP300

AP300 Ports and Connectors

The AP300 features the following ports and connectors:

- 10/100/1000 Ethernet port, copper
- 1 Serial console port (reserved)
- DC power input (5 Volts)
- 6 RPSMA external antenna connectors
AP300 Features

The AP300 Series, supported by System Director release 3.4.SR3 and later, includes the following features:

- 802.11n support with channel bonding in both 2.4GHz and 5GHz frequency bands. Channel bonding combines two 20Mhz channels into a single-wide 40Mhz channel for increased throughput.
- Dual-band external antenna options optimized for MIMO mode
- Plug and Play deployment using centralized controller platforms
- Multi-layered security including standard WPA2, 802.11i security such as automatic traffic inspection
- This access point is available in four different configurations.
  - AP320: Two 802.11n radios with 3x3 MIMO mode streams
  - AP310: Single 802.11n radio with 3x3 MIMO mode stream
  - AP311: Single 802.11n radio with 3x3 MIMO mode stream and single 802.11a/b/g radio (software upgradeable to 802.11n)
  - AP302: Two single 802.11a/b/g radios (both software upgradeable to 802.11n)
- Each of these Access points may be powered by a standard 802.3af for 2x2 MIMO Mode. For 3x3 full channel mode, use either a power supply or a a 802.3at PoE device.
- Air Traffic Control technology for 802.11n devices and legacy a/b/g devices
- 3x3 MIMO (Multiple Input, Multiple Output) technology with three dedicated, configurable input/output streams that deliver data rates up to 300 Mbps
- Software radio upgrades to 802.11n for maximum investment protection
- Channel span architecture which requires no channel planning or configuration
- Powered by 5 volt DC input, 802.3af compliant PoE device, or draft 802.3at compliant PoE device.
Chapter 2
Installing the AP300

This chapter describes how to physically install the Meru AP300. It contains the following sections:

- Safety Precautions
- Unpack the AP300
- Determine Power Requirements
- Installation Requirements
- Install the Access Points
- Check AP300 LED Activity
- Configure AP300 Software
- Troubleshooting

Safety Precautions

IMPORTANT—Read and follow the regulatory instructions in Appendix C before installing and operating this product.

If an optional power supply is used, it shall be a UL Listed power supply, marked Class 2 or LPS, and rated minimum 5 Vdc, 3A.

Unpack the AP300

The Meru AP300 series consists of the four models shown below. Depending on which model you are installing, you will have either six or three antennas. All drawings in this chapter show six antennas.
Table 1: Meru AP300 Radios and Antennas

<table>
<thead>
<tr>
<th>Model</th>
<th>Radio 1 (Ant4, Ant5, Ant6)</th>
<th>Radio 2 (Ant1, Ant2, Ant3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP320</td>
<td>a/b/g/n with 3 dual band omni-directional antennas</td>
<td>a/b/g/n with 3 dual band omni-directional antennas</td>
</tr>
<tr>
<td>AP311</td>
<td>a/b/g/n with 3 dual band omni-directional antennas</td>
<td>a/b/g with 3 dual band omni-directional antennas</td>
</tr>
<tr>
<td>AP310</td>
<td>a/b/g/n with 3 dual band omni-directional antennas</td>
<td>NA</td>
</tr>
<tr>
<td>AP302</td>
<td>a/b/g with 3 dual band omni-directional antennas</td>
<td>a/b/g with 3 dual band omni-directional antennas</td>
</tr>
</tbody>
</table>

Confirm that the AP300 shipping package contains these items:

- AP300 with attached mounting bracket
- Six (AP320, AP311, AP302) or three (AP310) antennas
- Power supply (optional)

Determine Power Requirements

Your power requirements will vary, depending on which AP300 radios are deployed and what mode is used. See below.

Table 2: AP300 Power Options

<table>
<thead>
<tr>
<th>AP300 Configuration</th>
<th>Power Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 radio - b/g mode</td>
<td>External power supply or PoE 802.3af</td>
</tr>
<tr>
<td>1 radio - n-mode</td>
<td>External power supply or PoE 802.3af</td>
</tr>
<tr>
<td>2 radios - 1 b/g-mode, 1 n mode</td>
<td>For 2x2 MIMO mode, use either a power supply or PoE 802.3af. For 3x3 MIMO mode, use either a power supply or a PoE 802.3at.</td>
</tr>
</tbody>
</table>
Installation Requirements

The AP300 has a security cable slot so you can lock the AP300 with a standard security cable, such as those used to secure laptop computers. See Figure 2.

An array of holes on the mounting bracket allows the AP300 to be mounted on the wall and over junction boxes or molly bolts. There are holes for passing the PoE Ethernet cable through the bracket if the bracket is mounted on a junction box.

These two AP200 kits can be used to mount the AP300 from the ceiling:

- MN-AP200-SCRMKIT: AP200 Suspended Ceiling Rail Mounting Kit
- MN-AP200-ASCMKIT: AP200 Above Suspended Ceiling Mounting Kit (T-Bar Hanger)

To complete AP300 installation, you need the items listed below.

<table>
<thead>
<tr>
<th>AP300 Configuration</th>
<th>Power Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 radios - both n mode</td>
<td>For 2x2 MIMO mode, use either a power supply or PoE 802.3af. For 3x3 MIMO mode, use either a power supply or a PoE 802.3at.</td>
</tr>
<tr>
<td>2 radios - both b/g-mode</td>
<td>External power supply or PoE 802.3af</td>
</tr>
</tbody>
</table>
Table 3: AP300 Installation Items

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Consumable Items Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal mounting</td>
<td>None</td>
</tr>
<tr>
<td>Vertical mounting over a wall stud</td>
<td>• Two #6 x 2” wood screws for a wood stud; or</td>
</tr>
<tr>
<td></td>
<td>• Two #6 x 1½” metal screws for a metal stud</td>
</tr>
<tr>
<td></td>
<td>• Mounting bracket</td>
</tr>
<tr>
<td>Vertical mounting on sheetrock</td>
<td>• Two #6 x 1” screws</td>
</tr>
<tr>
<td></td>
<td>• Two #4-6 x 7/8” ribbed plastic wall anchors</td>
</tr>
<tr>
<td></td>
<td>• Mounting bracket</td>
</tr>
<tr>
<td>Horizontal mounting below a hanging ceiling</td>
<td>• Two caddy fasteners</td>
</tr>
<tr>
<td></td>
<td>• Two plastic spacers</td>
</tr>
<tr>
<td></td>
<td>• Two keps nuts (with attached lock washer)</td>
</tr>
<tr>
<td></td>
<td>• Mounting bracket</td>
</tr>
<tr>
<td>Using existing Cisco 1230 series brackets</td>
<td>• Use included shoulder screws</td>
</tr>
</tbody>
</table>
Table 4: AP300 Installation Tools

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Tools Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal mounting</td>
<td>None</td>
</tr>
<tr>
<td>Vertical mounting over a wall stud</td>
<td>• Drill</td>
</tr>
<tr>
<td></td>
<td>• 1/8&quot;drill bit</td>
</tr>
<tr>
<td></td>
<td>• Screwdriver</td>
</tr>
<tr>
<td></td>
<td>• 1/8&quot;Allen wrench</td>
</tr>
<tr>
<td>Vertical mounting on sheetrock</td>
<td>• Drill</td>
</tr>
<tr>
<td></td>
<td>• 3/16&quot; drill bit</td>
</tr>
<tr>
<td></td>
<td>• Screwdriver</td>
</tr>
<tr>
<td></td>
<td>• 1/8&quot;Allen wrench</td>
</tr>
<tr>
<td>Horizontal mounting below a hanging ceiling</td>
<td>• Screwdriver</td>
</tr>
<tr>
<td></td>
<td>• Wrench or pliers</td>
</tr>
<tr>
<td></td>
<td>• 1/8&quot;Allen wrench</td>
</tr>
<tr>
<td>Using existing Cisco 1230 series brackets</td>
<td>• Screwdriver</td>
</tr>
</tbody>
</table>

Additional Equipment

A power source is needed to power the AP300. Available options are:

- External Power supply
- 802.3af compliant PoE device
- Draft 802.3at compliant PoE device

Install the Access Points

Select a Location

The AP300 is only intended for installation in Environment A as defined in IEEE 802.3af. All interconnected equipment must be contained within the same building, including the interconnected equipment's associated LAN connection. In addition, the AP300 should be mounted in a location that meets the following conditions:

- Relatively unobstructed access to the stations the AP serves. Select a location with minimal physical obstructions between the AP and the wireless stations. In an office with cubicles, mounting the APs below a hanging ceiling (plenum testing is not complete at this time) or the wall near the ceiling provides the least obstructed communications path. AP300
• Access to wall outlet or a to a Power over Ethernet (PoE) connection to the network switch servicing the controller.

Most installations receive the best coverage using the following guidelines:

• Install APs toward the center of the building.
• Do not install APs near metal objects, such as heating ducts, metal doors, or electric service panels.
• Relative to the ground, orient the antenna up or down, not sideways.

Note: The previous guidelines are general guidelines. Each site has its own unique environment. Place access points accordingly.

Attach the Antennas

The AP320, AP311, and AP302 have six external antenna ports, labeled 1 - 6. These units use all six antennas. Make sure that all external antennas and their associated wiring are located entirely indoors. The external antennas are not suitable for outside use.

Figure 1: AP320, AP 311 or AP302 Antennas 1-6

Make sure the following antenna connections are in place for correct operation of the AP320, AP311, and AP302.

For 802.11n operation (including 802.11 a/b/g):

• Radio1: Ant4, Ant5, Ant6
• Radio2: Ant1, Ant2, Ant3

For 802.11 a/b/g operation (no 802.11n):

• Radio1: Ant4
• Radio2: Ant1

For 2x2 802.11 a/b/g/n operation:
● Radio1: Ant4, Ant6
● Radio2: Ant1, Ant3

The AP310 and AP301 have six external antenna ports, labeled 1 - 6. However, AP310 and AP301 use only three antennas and the unused antenna connectors are blocked.

**Figure 2: AP310 or AP301 Antennas 1-3**

Make sure the following antenna connections are in place for correct operation of the AP310, and AP301.

For 802.11n operation (including 802.11 a/b/g):

● Radio1: Ant1, Ant2, Ant3

For 802.11 a/b/g operation (no 802.11n):

● Radio1: Ant1

For 2x2 802.11 a/b/g/n operation:

● Radio1: Ant1, Ant3

All standard attached antennas must be the same model. If you replace one antenna, replace them all.

Attach the antennas to the connectors on the AP300 (see Figure 4). Rotate the knurled ring at the base of the antenna clockwise to attach the antenna. The ring should be finger-tight.
Mount the Access Point

The AP300 ships with a detachable mounting bracket. The AP300 is designed to be compatible with brackets supplied by this company and by other vendors. AP300 mounts directly on the AP150 mounting bracket. If you are replacing AP200s, the AP300 bracket can be mounted on the old AP200 bracket with included shoulder screws; you don’t need to remove the old brackets. AP300 can also be directly mounted on Cisco brackets. You can mount an AP300 in the following ways:

- Horizontally on a surface, for example set the AP300 on a shelf
- Vertically on a wall
- Suspended from the ceiling
- Above a tiled hanging ceiling (plenum is supported)
- In an outdoor enclosure (using third party products - contact Meru Account representative for details)

Mount AP300 Horizontally

When mounting an AP300 horizontally, remove the mounting bracket. Be sure to position the antennas vertically when an AP300 sits on a surface. See Figure 1.

Mount AP300 on a Wall

Note: If you are replacing AP150s, you can use the existing brackets: the AP150 and AP300 use the same bracket. If you are replacing AP200s, the AP300 bracket can be attached to the old bracket with included shoulder screws; you don’t have to remove the old brackets.

To mount an AP300 on a wall:

1. Using the bracket holes as a guide, mark the location on the wall for the two AP bracket mounting screws. If possible, center the mounting screws on a wall stud. If you do not center the mounting screws on a wall stud, use plastic wall anchors.

2. Drill holes at the locations you marked:
3. If you are using plastic anchors, install them in the holes.
4. Screw in the screws most of the way.
5. Mount the bracket on the screws, placing the circular portion of the keyhole mounts over the screw heads and sliding the bracket down. Connect the Ethernet cable to the switch and to the AP300 Ethernet port shown in Figure 2.
6. If you are not using a PoE device, connect an external power supply to the power connector and plug it into the wall.

Mount Ap300 Below a Suspended Ceiling

The optional suspended ceiling mounting kit allows the AP300 mounting bracket to attach to suspended ceiling T-rails (see Figure 5).

Note: To comply with NEC code, attach a grounding wire to any of the screws used to attach the AP300 to the mounting bracket.

Figure 4: Mounting the AP300 to a Suspended Ceiling Rail

To mount an AP300 below a suspended ceiling:
1. Determine the location on the ceiling rail where the AP will be mounted and remove the ceiling tiles.
2. Place each of the two caddy fasteners on the ceiling T-rail and twist to attach to the rail.
3. Adjust the distance between the caddy fasteners by using the mounting bracket holes as a guide.
4. Tighten the caddy fasteners in place using a standard screwdriver. Do not overtighten.
5. Place each spacer on the caddy fastener stud. The spacer legs should contact the ceiling T-rail.
6. Align the mounting bracket keyholes with the caddy fastener studs and slide the AP300 to the narrow end of the hole.

7. Attach a keps nut to each caddy fastener stud and hand tighten. Do not overtighten.

8. Align the AP300 mounting posts over the circular portion of the keyhole mounts, push the AP in and slide the AP down until it engages with the locking detents (see Figure 5). You should hear it snap in place.

9. For each antenna, loosen the knurled ring at the base of the antenna (see Figure 4), point the antenna straight down, then retighten the ring.

10. Connect one end of the PoE Ethernet cable to the Ethernet connector.

   Caution! Be sure to connect the Ethernet cable to the Ethernet port; the cable can mistakenly be plugged into the Console port.

Mount AP300 Above a Suspended Ceiling

The optional T-bar box hanger mounting kit allows the AP300 to be mounted above suspended ceiling T-rails (see Figure 6). The installation attaches the T-bar box hanger to the ceiling rails using clips. The AP300 attaches to the mounting bracket that is attached to the T-bar box hanger.

The AP300 antennas should point straight down for this type of installation. You may need to modify thicker tiles to support this installation.

Warning! The AP300 with the metal enclosure exposed meets the requirements for fire resistance and low smoke-generating characteristics required by Section 300-22(C) of the National Electrical Code (NEC) for installation in a building’s environmental air space. You must remove the plastic enclosure to reveal the plenum-rated AP300 metal case for installations above a suspended ceiling.

Additionally, you must use Ethernet cable that meets the requirements for operating in plenums and environmental air space (in accordance with Section 300-22(C) of the NEC).

Warning! Any Fast Ethernet (FE) cables installed in air-handling spaces should be suitable under NEC Article 800.50 and marked accordingly for use in plenums and air-handling spaces with regard to smoke propagation, such as CL2-P, CL3-P, MPP (Multi Purpose Plenum), or CMP (Communications Plenum).
Check AP300 LED Activity

After the AP300 is connected, the LEDs should light (see Figure 7).
The functions of the five LEDs are described below.

When the AP300 is first connected to the controller and any time the access point is rebooted, the AP initializes with and then is programmed by the controller. When the AP is first powered up, all LEDs are green. Thereafter, the Status LED color reflects the various operating states described in below.
Table 5: AP300 LED Descriptions

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>off—no power</td>
</tr>
<tr>
<td></td>
<td>green—presence of power</td>
</tr>
<tr>
<td>Status</td>
<td>off—no power</td>
</tr>
<tr>
<td></td>
<td>green—booting stage 1</td>
</tr>
<tr>
<td></td>
<td>blinking green and off—booting stage 2</td>
</tr>
<tr>
<td></td>
<td>blinking green and white—discovering the controller</td>
</tr>
<tr>
<td></td>
<td>blinking green and blue—downloading a configuration from the controller</td>
</tr>
<tr>
<td></td>
<td>blinking blue and off—AP is online and enabled, working state</td>
</tr>
<tr>
<td></td>
<td>blinking red and yellow—failure; consult controller for alarm state</td>
</tr>
<tr>
<td>LAN</td>
<td>off—no power, or no link</td>
</tr>
<tr>
<td></td>
<td>green—link status OK (at any speed)</td>
</tr>
<tr>
<td></td>
<td>green/blinking—activity (at any speed)</td>
</tr>
<tr>
<td></td>
<td>red—auto negotiation failure</td>
</tr>
<tr>
<td>Radio 1</td>
<td>off—no radio present</td>
</tr>
<tr>
<td>Radio 2</td>
<td>green—radio enabled</td>
</tr>
<tr>
<td></td>
<td>green blinking—data activity</td>
</tr>
<tr>
<td></td>
<td>yellow—disabled or in scanning mode</td>
</tr>
<tr>
<td></td>
<td>red—failure</td>
</tr>
</tbody>
</table>

Configure AP300 Software

You can change the configuration for both the AP300 power source and the channel width. The defaults are:

- Power source is 802.3af
- Channel width is 20 MHz

These are the lowest (and slowest) settings. Increase range and throughput by changing N radios' MIMO mode to 3x3. The power supply option that you select determines the MIMO mode that can be used.

Note: Be sure to change the power supply setting to either DC power supply or 802.3at PoE before changing MIMO mode to 3x3.
Configure AP300 Using the CLI

Use the CLI command `configure ap` to set the Power Supply Type and `configure interface Dot11Radio` to set the Channel Width, and MIMO Mode. For example:

1. Open a terminal session on the controller.
2. Switch to configuration mode by entering `terminal configuration` at the CLI prompt. The prompt changes to `controller name config`.
3. Select the AP by entering the command `ap #`.
   
   
   default(config)# ap 1
4. Set the power supply value to `5V-DC` for AP Power, `802.3af Power Over Ethernet`, `802.3-at Power Over Ethernet`, or `dual-802.3-af Power Over Ethernet` with the CLI command `power-supply`.
   
   default(config-ap)# power-supply 5V-DC
5. Exit configuration mode with the CLI command `exit`.
6. Configure radio channel configuration with the CLI command `interface Dot11Radio # #` to switch to radio channel configuration.
   
   default(config-ap)# exit
default(config)# interface Dot11Radio 1 1
7. Change channel width from 20 MHz (default) to 40 MHz (either `40-mhz-extension-channel-above` or `0-mhz-extension-channel-below 40`) with the CLI command `channel-width`.
   
   default(config-if-802)# channel-width above 40 MHz Extension channel
8. Change MIMO Mode from `2x2` (default) to `3x3` with the `mimo-mode 3x3` command.
   
   default(config-if-802)# mimo-mode 3x3
default(config-if-802)# end

Configure AP300 Using the Web UI

Follow these steps to change Power Supply Type, Channel Width, and MIMO Mode using the Web UI:

1. Enter the IP address of the controller in your browser. The controller Web UI interface displays.
2. Click `Configuration > Devices > APs`. The AP Table shown below displays.
3. Click the arrow that corresponds to the AP300 to change. The AP configuration for that AP displays.

4. Click the Power Supply Type drop-down list and select one of the following options. The optional DC power block corresponds to the option 5V DC.
Configure AP300 Software

— **802.3-af**: Default power supply. Select this when using a traditional PoE. This power supply type only supports 2x2 MIMO mode.
— **802.3-at**: Select when using a higher-powered, next generation PoE. This power supply type supports 3x3 MIMO mode.
— **5V-DC**: Select when AP300 is plugged into a wall outlet. This power supply type supports 3x3 MIMO mode.
— **dual-802.3**: Select when using a dongle that combines power from two traditional PoEs. This power supply type supports 3x3 MIMO mode.

5. Click **OK**.


7. Configure RF Band Selection by selecting a value from the drop-down list. To configure the band as N only, select a setting that includes N and change the data rates setting to make only N viable.

8. Configure MIMO mode by clicking the drop-down list and selecting either 2x2 or 3x3. Be sure you have already configured an appropriate power source for 3x3 MIMO Mode. 3x3 MIMO Mode produces higher reliability, range, and speed but both settings (2x2 and 3x3) should approach 300 mbps.

9. Configure Channel Width by clicking the drop-down list and selecting either 40 MHz Extension channel above or 40 MHz Extension channel below. The ‘channel above’ and ‘channel below’ are relative to the value set in the Channel control setting (see the figure above, third setting from the top). This configures the channel bonding.

10. Click **OK**.

The AP300 is now configured.
Troubleshooting

- If an AP320 continually reboots or demonstrates other unusual behavior, and MIMO Mode is set to 3x3, there may be a mismatch of power and MIMO Mode. Make sure that you have an appropriate power source configured, as well as attached to an AP320 with MIMO Mode set to 3x3.

- When RF band selection is set to 802.11n, the security mode can only be set to clear, wpa2 or wpa2psk. This is an 802.11n restriction.

- The ChannelWidth field value 40 Mhz-extension-channel-above is only applicable if the extension channel above is available in the country code. For example, A_EXT_CHANNELS=36:40 case, 40 Mhz-extension-channel-above configuration is valid for channel number 36. Currently we support extension channels in only the US country code. In addition, the default channel numbers for RF mode BG or A mode are changed in the US country code (DEFAULT_B_CHANNEL=6, DEFAULT_A_CHANNEL=36).

Note: The following channel settings are recommend for optimum performance using channel bonding with 40MHz:

- 36 + 40mhz above
- 44 + 40mhz above
- 157 + 40mhz above
Troubleshooting
Appendix A

Channels

This appendix provides the access point radio channels supported by the world’s regulatory domains.

IEEE 802.11a

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11a 20-MHz-wide channel are listed in Table 6.

Note: All channel sets are restricted to indoor usage except the Americas, which allow for indoor and outdoor use on channels 52 through 64 in the United States.

Table 6: IEEE 802.11a Channels

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Frequency in MHz</th>
<th>Regulatory Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Americas</td>
</tr>
<tr>
<td>34</td>
<td>5170</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>5180</td>
<td>X</td>
</tr>
<tr>
<td>38</td>
<td>5190</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>5200</td>
<td>X</td>
</tr>
<tr>
<td>42</td>
<td>5210</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>5220</td>
<td>X</td>
</tr>
<tr>
<td>46</td>
<td>5230</td>
<td></td>
</tr>
</tbody>
</table>
### Table 6: IEEE 802.11a Channels (Continued)

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Frequency in MHz</th>
<th>Regulatory Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Americas</td>
</tr>
<tr>
<td>48</td>
<td>5240</td>
<td>X</td>
</tr>
<tr>
<td>52</td>
<td>5260</td>
<td>X</td>
</tr>
<tr>
<td>56</td>
<td>5280</td>
<td>X</td>
</tr>
<tr>
<td>60</td>
<td>5300</td>
<td>X</td>
</tr>
<tr>
<td>64</td>
<td>5320</td>
<td>X</td>
</tr>
<tr>
<td>149</td>
<td>5745</td>
<td>X</td>
</tr>
<tr>
<td>153</td>
<td>5765</td>
<td>X</td>
</tr>
<tr>
<td>157</td>
<td>5785</td>
<td>X</td>
</tr>
<tr>
<td>161</td>
<td>5805</td>
<td>X</td>
</tr>
<tr>
<td>165</td>
<td>5825</td>
<td>X</td>
</tr>
</tbody>
</table>

### IEEE 802.11b/g

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11b/g 22-MHz-wide channel are listed in Table 7.

**Note:** Mexico is included in the Americas regulatory domain; however, channels 1 through 8 are for indoor use only while channels 9 through 11 can be used indoors and outdoors. Users are responsible for ensuring that the channel set configuration complies with the regulatory standards of Mexico.
Table 7: IEEE 802.11b/g Channels

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Frequency in MHz</th>
<th>Americas</th>
<th>EMEA</th>
<th>Israel</th>
<th>China</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2412</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>2417</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>2422</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>2427</td>
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<td>X</td>
<td>X</td>
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<tr>
<td>5</td>
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<tr>
<td>6</td>
<td>2437</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>2442</td>
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<td>X</td>
<td>X</td>
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<td>8</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9</td>
<td>2452</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>2457</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>11</td>
<td>2462</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>2467</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>X</td>
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<tr>
<td>13</td>
<td>2472</td>
<td>-</td>
<td>X</td>
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<tr>
<td>14</td>
<td>2484</td>
<td>-</td>
<td>-</td>
<td>-</td>
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</tr>
</tbody>
</table>

(for 802.11b only)
IEEE 802.11n

The channel identifiers, channel center frequencies, and regulatory domains of each IEEE 802.11b/g 22-MHz-wide channel are listed in Table 8.

**Table 8: IEEE 802.11n Channels**

<table>
<thead>
<tr>
<th>Channel Number</th>
<th>Frequency in MHz</th>
<th>Regulatory Domains</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>North America</td>
<td>ETSI</td>
</tr>
<tr>
<td>1</td>
<td>2412</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>2417</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>2422</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>2427</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>2432</td>
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<td>6</td>
<td>2437</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>2442</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8</td>
<td>2447</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9</td>
<td>2452</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>2457</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>11</td>
<td>2462</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>2467</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>13</td>
<td>2472</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>14</td>
<td>2484</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Channel Number</td>
<td>Frequency in MHz</td>
<td>Regulatory Domains</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------</td>
<td>--------------------</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>North America</td>
<td>ETSI</td>
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<td>36</td>
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<td>X</td>
<td>X</td>
</tr>
<tr>
<td>40</td>
<td>5200</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>44</td>
<td>5220</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>48</td>
<td>5240</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>52</td>
<td>5260</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>56</td>
<td>5280</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>60</td>
<td>5300</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>64</td>
<td>5320</td>
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<td>X</td>
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<tr>
<td>100</td>
<td>5500</td>
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<td>104</td>
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<td>108</td>
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<td>-</td>
<td>X</td>
</tr>
<tr>
<td>112</td>
<td>5560</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>116</td>
<td>5580</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>120</td>
<td>5600</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>124</td>
<td>5620</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>128</td>
<td>5640</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>132</td>
<td>5660</td>
<td>-</td>
<td>X</td>
</tr>
<tr>
<td>Channel Number</td>
<td>Frequency in MHz</td>
<td>Regulatory Domains</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>------------------</td>
<td>---------------------</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td></td>
<td>North America</td>
<td>ETSI</td>
</tr>
<tr>
<td>136</td>
<td>5680</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>140</td>
<td>5700</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>149</td>
<td>5745</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>153</td>
<td>5765</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>157</td>
<td>5785</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>161</td>
<td>5805</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
Appendix B
Specifications

This chapter provides specifications for Meru Access Points and contains the following sections:

- Wireless Interface
- Ethernet Interface
- Physical Description

Wireless Interface

Table 9: Wireless Interface Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless Standards</td>
<td>802.11a, 802.11b, 802.11g, 802.11n</td>
</tr>
<tr>
<td>Antennas</td>
<td>Two to six external antennas. Omni-directional and directional antennas for specific coverage requirements</td>
</tr>
<tr>
<td>Wireless Medium Access</td>
<td>Wi-Fi Compliant 802.11 MAC standard</td>
</tr>
<tr>
<td>Power Management</td>
<td>Power-save mode for clients in both QoS mode and non-QoS mode</td>
</tr>
<tr>
<td>Frame Size</td>
<td>Peak frame size of &gt; 2346 bytes</td>
</tr>
<tr>
<td></td>
<td>Fragmentation and reassembly of 802.11/Ethernet frames</td>
</tr>
<tr>
<td>Client Activities Supported</td>
<td>Active scanning and passive scanning</td>
</tr>
<tr>
<td></td>
<td>Pre-authentication</td>
</tr>
<tr>
<td></td>
<td>Power-save mode supported</td>
</tr>
</tbody>
</table>
Ethernet Interface

<table>
<thead>
<tr>
<th>Feature</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireline Standard</td>
<td>• One Ethernet (IEEE 802.3) interface, supporting half-duplex and full-duplex modes</td>
</tr>
<tr>
<td></td>
<td>• Supports the Power over Ethernet (PoE) IEEE 802.3af standard</td>
</tr>
</tbody>
</table>

Physical Description

Physical specifications for Meru Access Points are provided in the access point Data Sheet.
The Meru Networks, Inc. Meru Access Points (APs) must be installed and used in strict accordance with the manufacturer’s instructions as described in the user documentation that comes with the product. For country-specific approvals, see below. Meru Networks, Inc. is not responsible for any radio or television interference caused by unauthorized modification of APs, or the substitution or attachment of connecting cables and equipment other than that specified by Meru Networks, Inc. The correction of interference caused by such unauthorized modification, substitution or attachment is the responsibility of the user. Meru Networks, Inc. and its authorized resellers or distributors are not liable for any damage or violation of government regulations that may arise from the user failing to comply with these guidelines.

USA — Federal Communications Commission (FCC)

FCC Radiation Exposure Statement

Caution! The radiated output power of the Meru Networks, Inc. devices is well below the FCC radio frequency exposure limits. However, the Meru Networks, Inc. Meru Access Points should be used in such a manner that the potential for human contact during normal operation is minimized. To avoid the possibility of exceeding the FCC radio frequency exposure limits, you should keep a distance of at least 20 cm (8 inches) between you (or any other person in the vicinity) and the Access Point antennas.
Radio Frequency Interference Requirements

Interference Statement

Meru Networks Meru Access Point
These devices are restricted to indoor use because they operate in the 5.15 to 5.25 GHz frequency range. The FCC requires such products to be used indoors for the frequency range 5.15 GHz to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

High-power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with or damage to these devices, or both.

Note:

These devices comply with Part 15 of the FCC Rules. Operation of the devices is subject to the following two conditions: (1) The devices may not cause harmful interference, and (2) The devices must accept any interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If the equipment is not installed and used in accordance with the instructions, the equipment may cause harmful interference to radio communications. There is no guarantee, however, that such interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception (which can be determined by turning the equipment off and on), the user is encouraged to try to correct the interference by taking one or more of the following measures:

- Relocate this device.
- Increase the separation between the device and the receiver.
- Connect the device into an outlet on a circuit different from that of other electronics.
- Consult the dealer or an experienced radio technician for help.

Note:

The Meru Access Point must be installed and used in strict accordance with the manufacturer’s instructions as described in the user documentation that comes with the product. Any other installation or use may violate FCC Part 15 regulations. Modifications not expressly approved by Meru Networks, Inc. could void your authority to operate the equipment.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.
This device complies with RSS210 of Industry Canada.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of this device.

L'utilisation de ce dispositif est autorisée seulement aux conditions suivantes: (1) il ne doit pas produire de brouillage et (2) l'utilisateur du dispositif doit être prêt à accepter tout brouillage radioélectrique reçu, même si ce brouillage est susceptible de compromettre le fonctionnement du dispositif.

The term “IC” before the equipment certification number only signifies that the Industry Canada technical specifications were met.

To reduce the potential radio interference to other users, the antenna type and gain should be chosen so that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

Pour empecher que cet appareil cause du brouillage au service faisant l'objet d'une licence, il doit etre utilize a l'interieur et devrait etre place lin des fenetres afin de Fournier un ecram de blindage maximal. Si le matriel (ou son antenne d’emission) est installe a l’exterieur, il doit faire l'objet d’une licence.

Caution!

Exposure to Radio Frequency Radiation.
The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit an RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada’s website http://www.hc-sc.gc.ca/rpb.

Note:

Meru Networks Meru Access Points
These devices are restricted to indoor use because they operate in the 5.15 to 5.25 GHz frequency range. Industry Canada requires such products to be used indoors for the frequency range 5.15 GHz to 5.25 GHz to reduce the potential for harmful interference to co-channel Mobile Satellite systems.

High-power radars are allocated as primary users of the 5.25 to 5.35 GHz and 5.65 to 5.85 GHz bands. These radar stations can cause interference with or damage to these devices, or both.
Europe—EU Declaration of Conformity and Restrictions

This equipment is marked with either the CE Mark, the alert symbol, and the notified body's number and can be used throughout the European Community. This mark indicates compliance with the R&TTE Directive 1999/5/EC and the relevant parts of the following technical specifications.

EN 300 328. Electromagnetic Compatibility and Radio Spectrum Matters (ERM). Wideband transmission systems, data transmission equipment operating in the 2.4 GHz ISM (Industrial, Scientific, and Medical frequency bands in the range of 902–928 MHz, 2.4–2.485 GHz, 5.15–5.35 GHz, and 5.75–5.825 GHz.) band and using spread spectrum modulation techniques, harmonized EN standards covering essential requirements under article 3.2 of the R&TTE directive


EN 60950-1. Safety of Information Technology Equipment

EN 50385. Product standard to demonstrate the compliances of radio base stations and fixed terminal stations for wireless telecommunication systems with the basic restrictions or the reference levels related to human exposure to radio frequency electromagnetic fields.

Marking by the alert symbol indicates that usage restrictions apply.

Meru Networks, Inc. declares that their Access Points complies with the essential requirements and other relevant provisions of Directive 1999/5/EC.

Meru Networks, Inc. vakuuttaa täten että Access Points tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.

Hierbij verklaart Meru Networks, Inc. dat het toestel Access Points in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG.

Hierbij verklaart Meru Networks, Inc. dat deze Access Points voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.

Par la présente, Meru Networks, Inc. déclare que l’appareil Access Points est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.

Par la présente, Meru Networks, Inc. déclare que ce Access Points est conforme aux exigences essentielles et aux autres dispositions de la directive 1999/5/CE qui lui sont applicables.

Härmed intygar Meru Networks, Inc. att denna Access Points står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.

Undertegnede Meru Networks, Inc. erklærer herved, at følgende udstyr Access Points overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.

Hiermit erklärt Meru Networks, Inc. die Übereinstimmung des Gerätes Access Points mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG.

Con la presente Meru Networks, Inc. dichiara che questo Access Points è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.

Por medio de la presente Meru Networks, Inc. declara que el Access Points cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.

Meru Networks, Inc. declara que este Access Points está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.

Hawnhekk, Meru Networks, Inc. jiddikjara li dan Access Points jikkonforma mal-htigijiet essenzjali u ma provvedimenti ohrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.

Käesolevaga kinnitab Meru Networks, Inc. seadme Access Points vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.

Alulírott, Meru Networks, Inc. nyilatkozom, hogy a Access Points megfelel a vonatkozó alapvető követelményeknek és az 1999/5/EC irányelv egyéb előírásainak.

Meru Networks, Inc. týmto vyhlasuje, e Access Points splna základné poiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.

Meru Networks, Inc. tímto prohlašuje, e tento Access Points je ve shode se základními poadavky a dalšími príslušnými ustanoveními smernice 1999/5/ES.


Ar šo Meru Networks, Inc. deklare, ka Access Points atbilst Direktivas 1999/5/EK butiskajam prasībam un citiem ar to saistītiem noteikumiem.

Niniejszym, Meru Networks, Inc. , deklaruje, że Access Points spełnia wymagania zasadnicze oraz stosowne postanowienia zawarte Dyrektywie 1999/5/EC.

These products are intended to be used in all countries of the European Economic Area with the following restrictions:

**IEEE 802.11a Restrictions**

- These products are for indoor use only when using channels 36, 40, 44, 48, 52, 56, 60, or 64 (5150-5350 MHz).
- Dynamic frequency selection (DFS) and transmit power control (TPC) must remain enabled to ensure product compliance with EC regulations.
- To ensure compliance with local regulations, be sure to set your Access Point to the country in which you are using the Access Point.
The Meru Networks, Inc. products can be used only indoors in the following countries: Austria, Belgium, Bulgaria, Czech Republic, Germany, Cyprus, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Norway, Portugal, Poland, Romania, Spain, Slovak Republic, Slovenia, Sweden, Switzerland, Turkey, and United Kingdom.

France

In all Metropolitan départements, wireless LAN frequencies can be used under the following conditions, either for public or private use:

Indoor use: maximum power (EIRP) of 100 mW for the entire 2400-2483.5 MHz frequency band.

The AP300 is built in Taiwan. Factory information is provided under NDA and upon request.
MERU NETWORKS, INC.

Limited Product Warranty

This Limited Product Warranty applies to the original end-user customer of the Meru product which you purchased for your own use, and not for resale (“Product”), from Meru Networks, Inc. (“Meru”) or its authorized reseller (“Reseller”).

Limited Warranties

- One-year limited hardware warranty: Meru warrants to you that Meru hardware (other than Third Party Products as described below) will be free from defects in materials and workmanship for a one-year period after the date of delivery of the applicable product to you from Meru or its Reseller (the “Hardware Warranty Period”). If Meru receives written notice from you of such defects during the Hardware Warranty Period, Meru will, at its option, either repair or replace Meru hardware that Meru determines to be defective. Replacement products may be remanufactured units, and will be warranted for the remainder of the original Hardware Warranty Period, or if greater, for thirty days from delivery of such replacement. Should Meru be unable to repair or replace the Meru hardware, Meru (or its Reseller, as applicable) will refund to you the purchase price of the Product.

- 90-Day Limited Software Warranty: Meru warrants to you that, for a 90-day period after the date of delivery of the applicable product to you from Meru or its Reseller (the “Software Warranty Period”), when properly installed and used, (a) the media on which the Meru software is provided will be free from defects in materials or workmanship; and (b) the Meru software will substantially conform to the functional specifications in the applicable documentation. If Meru receives written notice from you of a breach of this warranty during the Software Warranty Period and is able to reproduce the defect, Meru will, at its option, either repair or replace the defective Meru software. Should Meru be unable to repair or replace the Meru software, Meru (or its Reseller, as applicable) will refund to you the purchase price of the Product.

Exclusions

The warranty on the Product shall not apply to defects resulting from the following:

- Alteration or modification of the Product in any way, including without limitation configuration with software or components other than those supplied by Meru or integration with parts other than those supplied by Meru.

- Abuse, damage or otherwise being subjected to problems caused by negligence or misapplication (including without limitation improper or inadequate maintenance or calibration), relocation of the products (including without limitation damage caused by use of other than Meru shipping containers), or use of the products other than as specified in the applicable Meru product documentation (including without limitation incompatible operating environments and systems), or improper site preparation or maintenance.

- Damage as a result of accidents, extreme power surge, extreme electromagnetic field, acts of nature or other causes beyond the control of Meru.

- Use of the Product with software, interfacing, parts or supplies not supplied by Meru.

The warranty on the Product does not apply if the Product is sold, or in the case of software, licensed, for free for evaluation or demonstration purposes.

Meru expressly disclaims any warranty or obligation to support the Product for all operating environments - for example, as illustration and not limitation, Meru does not warrant or ensure interoperability of the Product with future telecommunication systems or other future software or hardware.
You understand and acknowledge that the Products may generate, use or radiate radio frequency energy and may interfere with radio communications and/or radio and television receptions if is not used and/or installed in accordance with the documentation for such products. WHILE MERU USES COMMERCIALLY REASONABLE EFFORTS TO ENSURE COMPLIANCE OF THE PRODUCTS WITH APPLICABLE UNITED STATES FEDERAL COMMUNICATIONS COMMISSION AND PROTECT AGAINST HARMFUL INTERFERENCES, YOU ACKNOWLEDGE AND

AGREE THAT INTERFERENCES WITH RADIO COMMUNICATIONS AND/OR RADIO AND TELEVISION RECEPTIONS MAY OCCUR AND THAT MERU WILL NOT BE LIABLE FOR ANY DAMAGES OR INCONVENIENCE BASED ON SUCH INTERFERENCES.

Third Party Products - The above Limited Warranties are exclusive of products manufactured by third parties (“Third Party Products”). If such third party manufacturer provides a separate warranty with respect to the Third Party Product, Meru will include such warranty in the packaging of the Meru Product.

Return procedures

To obtain warranty service you must: (a) obtain a return materials authorization number ("RMA#") from Meru by contacting rmaadmin@merunetworks.com, and (b) deliver the Product, in accordance with the instructions provided by Meru, along with proof of purchase in the form of a copy of the bill of sale including the Product's serial number, contact information, RMA# and detailed description of the defect, in either its original package or packaging providing the Product with a degree of protection equivalent to that of the original packaging, to Meru at the address below. You agree to obtain adequate insurance to cover loss or damage to the Product during shipment. If you obtain an RMA# and return the defective Product as described above, Meru will pay the cost of returning the Product to Meru. Otherwise, you agree to bear such cost, and prior to receipt by Meru, you assume risk of any loss or damage to the Product. Meru is responsible for the cost of return shipment to you if the Meru Product is defective.

Returned products which are found by Meru to be not defective, returned out-of-warranty or otherwise ineligible for warranty service will be repaired or replaced at Meru's standard charges and shipped back to you at your expense.

At Meru's sole option, Meru may perform repair service on the Product at your facility, and you agree to provide Meru with all reasonable access to such facility and the Product, as required by Meru. On-site repair service may be available and is governed by the specific terms of your purchase.

All replaced parts, whether under warranty or not, are the property of Meru.

Warranty limitations

THE WARRANTIES SET FORTH ABOVE ARE EXCLUSIVE AND NO OTHER WARRANTY, WHETHER WRITTEN OR ORAL, IS EXPRESSED OR IMPLIED BY MERU, TO THE MAXIMUM EXTENT PERMITTED BY LAW. THERE ARE NO OTHER WARRANTIES RESPECTING THE PRODUCT AND DOCUMENTATION AND SERVICES PROVIDED UNDER THIS AGREEMENT, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF DESIGN, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (EVEN IF MERU HAS BEEN INFORMED OF SUCH PURPOSE), TITLE OR AGAINST INFRINGEMENT OF THIRD PARTY RIGHTS. IF ANY IMPLIED WARRANTY CANNOT BE DISCLAIMED UNDER APPLICABLE LAW, THEN SUCH IMPLIED WARRANTY SHALL BE LIMITED IN DURATION TO THE HARDWARE AND SOFTWARE WARRANTY PERIODS DESCRIBED ABOVE. NO AGENT OF MERU IS AUTHORIZED TO ALTER OR EXCEED THE WARRANTY OBLIGATIONS OF MERU.

MERU SPECIFICALLY DOES NOT WARRANT THAT THE MERU SOFTWARE WILL BE ERROR FREE OR OPERATE WITHOUT INTERRUPTION.

THE REMEDIES IN THIS LIMITED PRODUCT WARRANTY ARE YOUR SOLE AND EXCLUSIVE REMEDIES, AND MERU'S SOLE AND EXCLUSIVE LIABILITY, FOR BREACH OF THE HARDWARE OR SOFTWARE WARRANTY SET FORTH ABOVE.

Limitations of Liability

You acknowledge and agree that the consideration which you paid to Meru does not include any consideration by Meru of the risk of consequential, indirect or incidental damages which may arise in connection with your use of, or inability to use, the Product. THUS, MERU AND ITS RESELLER WILL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, SPECIAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION LOST PROFITS, LOST BUSINESS, LOST DATA, LOSS OF USE,
OR COST OF COVER INCURRED BY YOU ARISING OUT OF OR RELATED TO YOUR PURCHASE OR USE OF, OR INABILITY TO USE, THIS PRODUCT OR THE SERVICES, UNDER ANY THEORY OF LIABILITY, WHETHER IN AN ACTION IN CONTRACT, STRICT LIABILITY, TORT (INCLUDING NEGLIGENCE) OR

OTHER LEGAL OR EQUITABLE THEORY, EVEN IF MERU OR ITS RESELLER KNEW OR SHOULD HAVE KNOWN OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY EVENT, THE CUMULATIVE LIABILITY OF MERU OR ITS RESELLER FOR ALL CLAIMS WHATSOEVER RELATED TO THE PRODUCT OR THE SERVICE WILL NOT EXCEED THE PRICE YOU PAID FOR THE PRODUCT OR SERVICES GIVING RISE TO SUCH CLAIMS.

THE LIMITATIONS SET FORTH HEREIN ARE INTENDED TO LIMIT THE LIABILITY OF MERU AND ITS RESELLERS AND SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

The jurisdiction applicable to you may not allow the limitations of liability or damages set forth above, in which case such limitation shall only apply to you to the extent permitted in such jurisdiction.

Additional Information

This Limited Product Warranty shall be governed by and construed in accordance with the laws of the State of California, U.S.A., exclusive of its conflict of laws principles. The U.N. Convention on Contracts for the International Sale of Goods shall not apply.

This Limited Product Warranty is the entire and exclusive agreement between you and Meru with respect to its subject matter, and any modification or waiver of any provision of this statement is not effective unless expressly set forth in writing by an authorized representative of Meru.

All inquiries or claims made under this Limited Product Warranty must be sent to Meru at the following address:

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Sunnyvale, CA 94089
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Fax: +1 (408) 215-5301

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