

# Cisco Aironet Bridge Troubleshooting

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## Introduction

This document covers basic troubleshooting for Cisco Aironet BR340 and BR350 Series Bridges. This document does not cover any issues related to security or Spanning Tree Protocol (STP).

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

The information in this document is based on these software and hardware versions:

- Cisco Aironet BR340 and BR350 Series Bridges
- All VxWorks BR340 and BR350 software versions

These assumptions are also made:

- Before you install the bridges on a tower or roof, configure them in a test lab and keep them fairly close together.
- A new bridge out of the box is, by default, a root bridge. The term "root bridge" in this document does not refer to spanning-tree root, but to "802.11b root." In the 802.11b network, there can be only one root bridge. If you have a point-to-point bridge connection, one bridge must be configured as root and the other must be non-root. A root bridge cannot talk to another root bridge. IP addresses can be assigned to the bridges either through DHCP or statically. Make sure that both bridges are set for the same channel (frequency). If multiple bridge pairs are installed, use non-overlapping channels between adjacent pairs. In 802.11b, there are three channels that do not overlap: 1, 6, and 11. You should run a carrier test to find out which channel is least busy in the target radio frequency (RF) environment.

## Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

# Troubleshoot the Bridge

## Troubleshoot Bridge Hardware

Complete these steps:

1. Check the LED status on the bridge.

The middle LED is labelled *Status*. If the Status LED flashes, it means that the bridges are not locked on to each other. When the two bridges detect each other and an RF link is established (that is, the bridges are associated), the status LED is solid green. When there are more than two bridges in a point-to-multipoint configuration, even if one non-root bridge is not associated and one non-root bridge is associated, the status LED of the root bridge is still solid.

The bottom LED is labelled *Ethernet*. If the Ethernet LED flashes red, a link is not established over the wired side of the bridge. Normally, a straight-through cable is used from the bridge to a hub or switch, and a crossover cable is used from one bridge to another, or from a bridge directly to a wired client.

2. Make a Telnet or console connection into the bridge.

Verify that the same service-set identifier (SSID) has been configured on both of the bridges. The SSID is case sensitive. Check the roles of each bridge; one should be root and the other non-root. Check the association table to see if the remote bridge is listed. Ping the IP address of the bridge on the opposite end to check the connectivity of the link.

3. If problems persist and the link does not establish, reset the bridges to their defaults and reconfigure the bridges with basic settings to see if the link comes up.

## Troubleshoot RF

If the root and non-root bridges do not associate with each other, perform RF troubleshooting.

1. Line of Sight

Make sure that there is visual and radio line of sight between the root and non-root bridges. Check to ensure that the Fresnel Zone is not obstructed. It may be necessary to raise the antenna height in order to clear the Fresnel Zone. If the bridges are more than six miles apart, the curvature of the earth encroaches on the Fresnel Zone. For additional assistance, refer to the Outdoor Bridge Range Calculation Utility.

2. Antenna

Ensure that the appropriate antennas are used and that antenna placement and alignment are correct.

3. Antenna Selection

The antenna is a critical part of the bridge installation. Cisco offers different kinds of bridge antennas for different applications. Refer to the Cisco Aironet Antennas and Accessories Data Sheet for additional information and details on each antenna model.

There are two kinds of antennas:

- ◆ Omnidirectional antennas (which provide 360 degree coverage)
- ◆ Directional antennas (which provide a limited range of coverage)

#### 4. Antenna Gain

Antenna Gain is measured in dBi and dBd (0 dBd = 2.14 dBi). If the gain of the antenna goes up, the width of the coverage area that antenna provides goes down. Coverage areas or radiation patterns are measured in degrees. These angles are referred to as beam width and they have horizontal and vertical measurements. Wider angles mean wider coverage, while smaller angles (typically with higher gain) mean more coverage. In most installations, antennas should be installed in a vertical polarization (antenna perpendicular to the ground).

The range of powers, voltages, and currents encountered in radio engineering is too broad to be expressed on a linear scale. Consequently, a logarithmic scale based on the decibels (dB, one tenth of a bel) is used. Decibels do not specify a magnitude of a power, voltage, or current, but rather, a ratio between two values of them. The unit dBm is a power level relative to 1 milliwatt (mW). An important relationship to remember is:

$$0 \text{ dBm} = 1 \text{ mW} \quad \text{Power (dBm)} = 10 \log (\text{power in mW}/1 \text{ mW})$$

For example, if an amplifier has an output of 20 W, its output in dBm would be 43 dBm:

$$\text{Power (dBm)} = 10 \text{ Log } (20000/1) = + 43 \text{ dBm}$$

If a high-gain omnidirectional antenna is used, make sure that it is mounted at a correct height. The omnidirectional antenna radiates the signal in a donut shape around the tip of the antenna. If the antenna is not mounted correctly, it is possible that the signal could pass over the target receiver antenna.

For more information on this topic, refer to RF Power Values.

#### 5. Antenna Placement

Poor antenna placement (such as duct taped to a metal object) can cause many problems. Make sure that the antenna support structure is solid. An example of a poor antenna support structure would be one mounted on a pole that waves back and forth in the wind. Make sure that the antenna mounting is weather proof. Cisco Aironet Bridges are not designed to be subjected to weather unless contained in an enclosure. Be sure that there is no water in or on the antenna cable, and that the antenna cable is grounded. Antenna cables are not designed to protect network devices from static electricity or lightning surges that travel on coaxial transmission lines.

#### 6. Antenna Alignment Tool and Carrier Test

It is very important to point the antenna in the right direction. Cisco has a light duty tool, the antenna alignment tool, built into the bridge operating system that helps align the antenna in the correct direction. A carrier busy test is also provided to help to avoid RF interference and to find out which channel is less busy.

#### 7. Transmission Line

Avoid use of long, coaxial antenna cables. The longer the cable, the higher the signal loss over that cable. RF energy is carried between the antennas and the radio equipment through coaxial cable. Actual decibel loss depends on the type of cable chosen, but Cisco low-loss cable encounters approximately 6 dB for every 100 feet of cable. Loss occurs on both transmitted and received signals. If the cable diameter is larger, loss is decreased, but thicker cable is more costly. Make sure that the cable is not crimped in any way. Finally, as the transmitted frequency (channel) increases, so does signal loss.

#### 8. If the signal passes through glass, metallic tint on the glass can degrade the signal.

9. Rain, fog, and other environmental conditions degrade the signal.
10. Federal Communications Commission (FCC) Part 15.204 prohibits the use of amplifiers in systems with which they have not been certified.

## Software Update

In order to update the VxWorks software, refer to Upgrading Bridge Firmware and follow the procedure.

Cisco Aironet BR340 and BR350 Series Bridges can run only VxWorks firmware. In order to recover from an attempt to upgrade to Cisco IOS<sup>®</sup> software, refer to Upgrading VxWorks Firmware from the Console and follow the procedure.

## Other Issues

In order to troubleshoot other common issues in wireless bridge networks, refer to Troubleshoot Common Problems with Wireless Bridged Networks.

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## Related Information

- **Wireless Support Resources**
- **Cisco Aironet Ethernet Bridge and WGB FAQ**
- **Aironet 350 Series Wireless LAN Products**
- **WLAN Radio Coverage Area Extension Methods**
- **Performing a Site Survey**
- **Outdoor Bridge Range Calculation Utility**
- **Fixing a Broken Wireless LAN Connection**
- **Troubleshooting Problems Affecting Radio Frequency Communication**
- **Diagnostics and Troubleshooting**
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