

# AIRAVE 3 LTE

## User Guide



[UG template version 16a]

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# Introduction

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The AIRAVE 3 LTE is an indoor small cell intended for use by small to medium size businesses. The device contains an S1000 coupled with the CDMA FAP (cFAP) in a single enclosure. The combination of the S1000 and cFAP allows both data and voice capability in a single offering.

The AIRAVE offers any-to-any mobility through LTE technology, offering users seamless mobility between indoor and outdoor coverage. It also offers dual- concurrent 2.4/5 GHz 802.11ac WiFi to deliver high data rates and performance.

The WiFi capabilities include automatic channel selection and Interference avoidance, and Band steering to 5GHz for supporting devices. Up to 12 SSIDs are supported with transparent authentication of public SSIDs using the 802.1x protocol.

Circuit Switched Fallback (CSFB) enables circuit switched voice and SMS services to be delivered to dual radio Long Term Evolution (LTE) component of the AIRAVE, then switched to the 3G network running on the internal cFAP.

# Using this guide

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This user guide introduces you to the services and features of the AIRAVE. The guide is divided into the following chapters:

- [Getting Started](#)
- [Configuring the AIRAVE Router](#)
- [Using the AIRAVE](#)
- [Troubleshooting](#)
- [Safety information](#)

It is important that you read each section and note any special requirements before you use the device.

 **Please read the [Safety information](#) to learn about how to safely use your device. Failure to read and follow the safety information in this user guide may result in serious bodily injury, death, or property damage.**

# Getting Started

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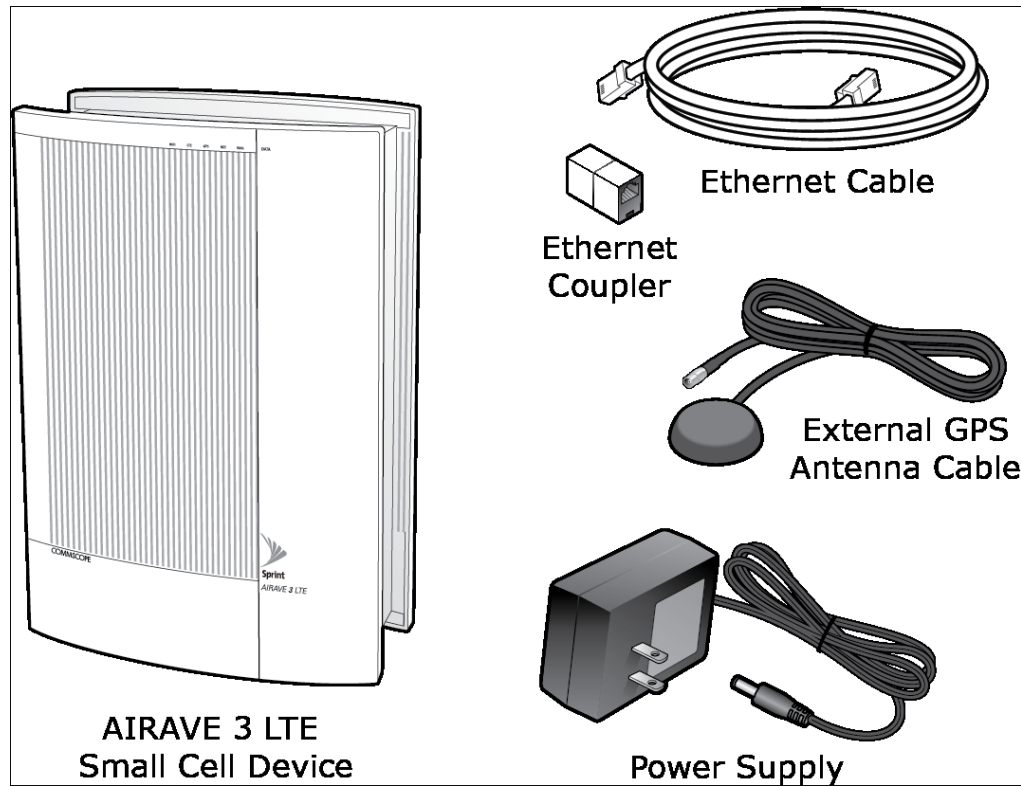
This chapter describes the contents of the box and setting up your AIRAVE.

- [What's in the box](#)
- [Setup at a glance](#)
- [Setting up your AIRAVE](#)
- [Begin Self-Installation](#)
- [Setting up optional components](#)

**NOTE:** When you complete this section, configure WiFi and other services of the internal router in [Configuring the AIRAVE Router](#).

## What's in the box

Ensure that the following items are in the box, along with the Quick Start Guide.

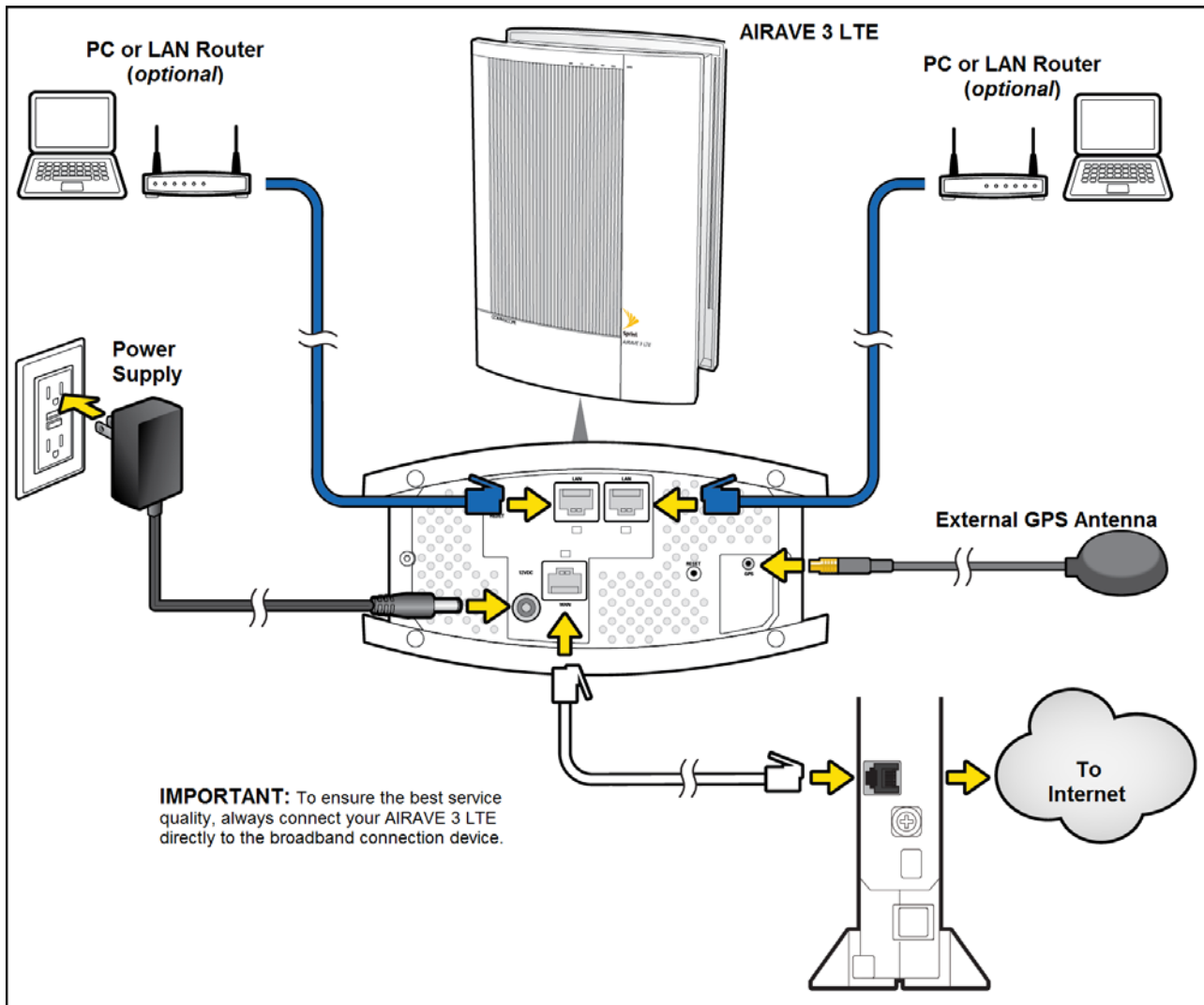


# Setup at a glance

The following diagram shows a typical AIRAVE 3 LTE desktop setup.



Place the unit on its side on a flat surface to expose the bottom of the unit.

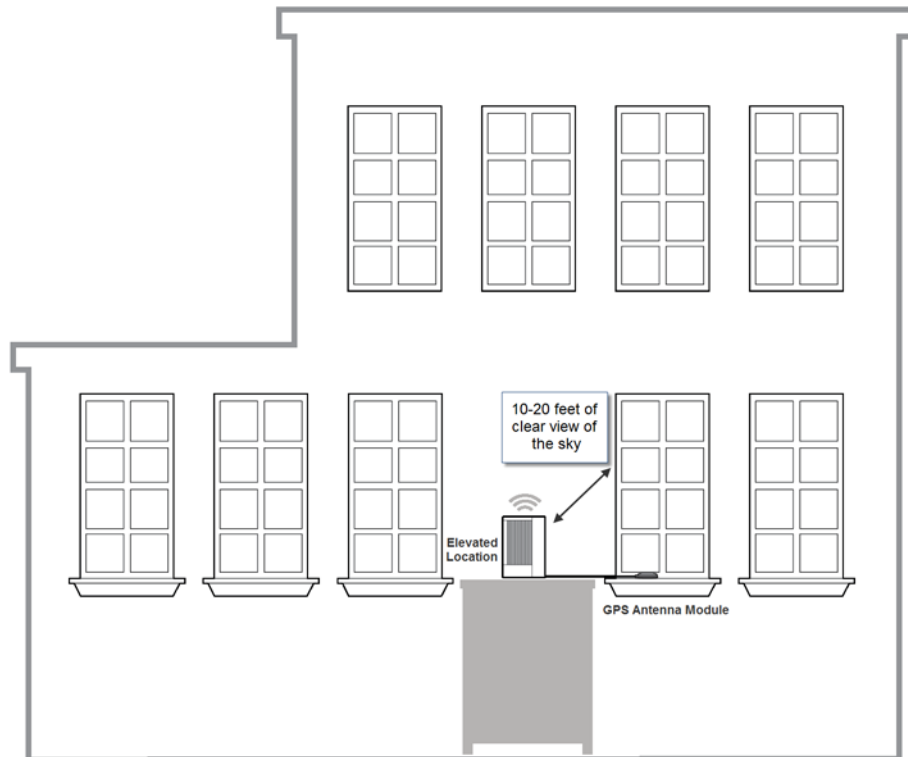


# Setting up your AIRAVE

Follow these steps to install your AIRAVE inside your office or other location.

## Place the unit

The following diagram shows a typical placement of an AIRAVE 3 LTE in a building.



Place the device:

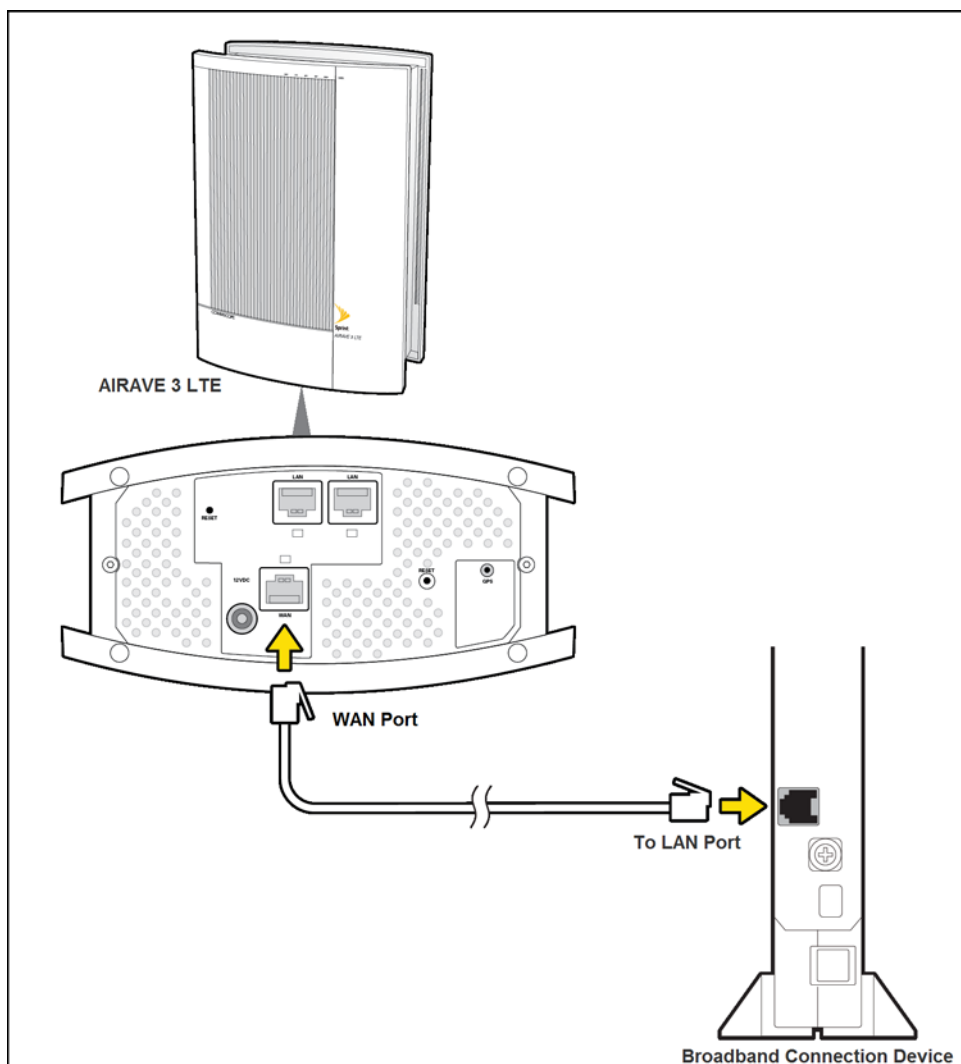
- In an elevated location, such as the top of a bookshelf or tall cabinet.
- Within 10 to 20 feet of a window, or a clear view of the sky
- Within reach of your broadband modem or router
- Within reach of an electrical outlet



## Connect the WAN port

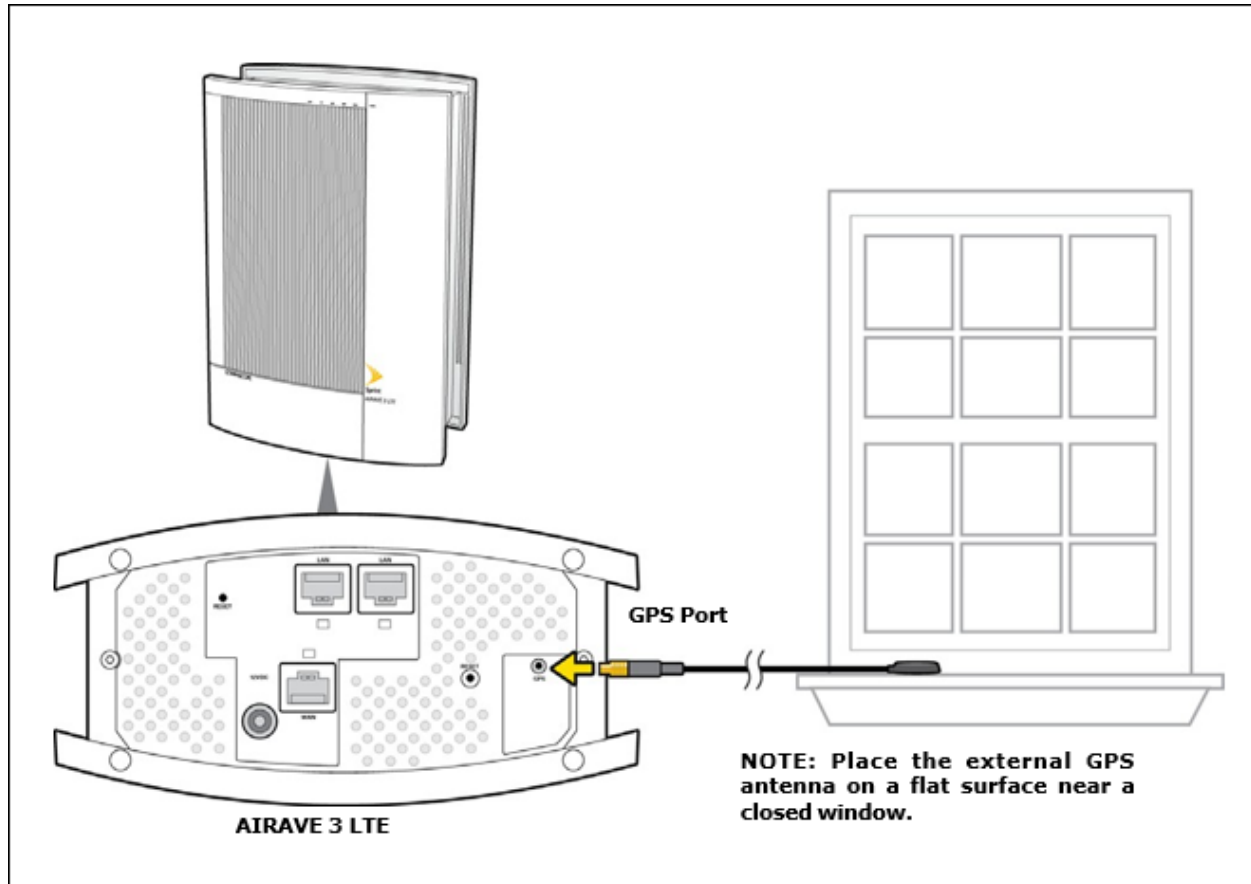
1. Connect one end of the Ethernet cable to an available LAN port on your broadband connection device, or to a LAN port on your network.
  - If you are connecting to a LAN network:
    - Open UDP ports 53, 67, 500 and 4500 bi-directionally
    - Contact your IT administrator for assistance
2. Connect the other end of the Ethernet cable to the WAN port of your AIRAVE.

**NOTE:** If the supplied Ethernet cable is not long enough to reach the AIRAVE, use the Ethernet Coupler with an additional Ethernet cable to reach the device.



## Connect the external GPS antenna

1. Connect the external GPS cable to the GPS port.
2. Position the GPS antenna module on a flat surface near a closed window.



Do not place the GPS antenna:

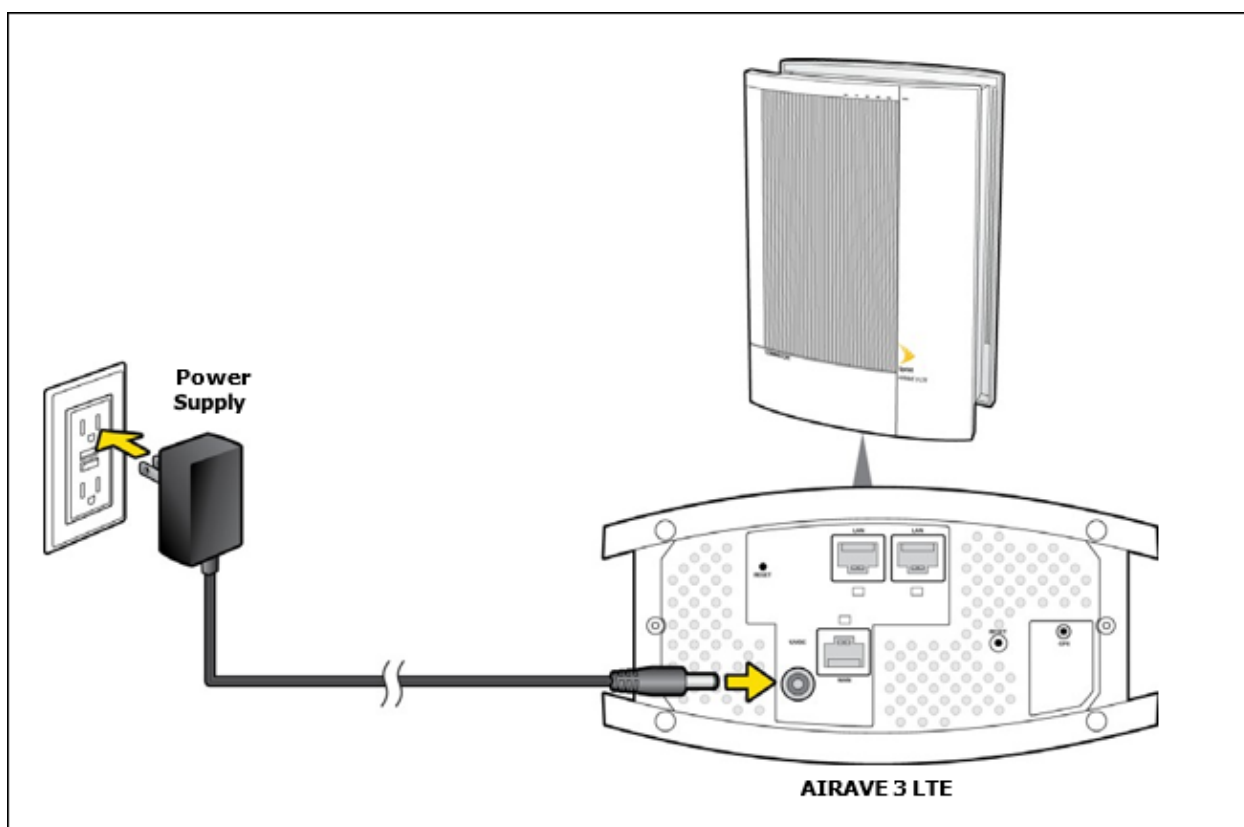
- Outdoors; it is not weatherproof.
- Behind large, heavy objects such as furniture; doing so could affect the signal.

**NOTE:** You may defer step 2 until after the unit has been placed upright in the next section.

**NOTE:** After initial installation, GPS may take 30-40 minutes to get a GPS time fix.

## Connect the power supply

1. Plug the power supply connector into the black power port.



Stand the unit upright and carefully move all cables so they come out of one long end of the unit. There is room for cables to come out from beneath the unit once it is placed upright.

2. Plug the other end of the power cable into an available electrical outlet. (*We recommend a surge protected outlet.*)

# Begin Self-Installation

When you power on your AIRAVE 3 LTE for the first time, it will go through an automated setup sequence.

**NOTE:** Each side of the AIRAVE has a set of LEDs specific to Data or Voice services.

1. During boot-up the device LEDs will be solid green for a few seconds during initial hardware tests. This takes approximately 8 to 10 seconds.
2. The WAN LED on both sides will turn solid green; all other LEDs will be OFF. This takes approximately 2 minutes.
3. The WAN LED on both sides will stay solid green; all other LEDs will blink red.

**NOTE:** Steps 1 through 3 are expected behavior.

4. The NET LED on both sides will turn solid green. This will take approximately 15 minutes.

**NOTE:** If the WAN or NET LEDs are solid red after 15 minutes, talk to your IT administrator to diagnose problems with your internet connection.

5. This is a good time to take a break.

The device will go continue the self-installation process. During this time the device may download software images and perform automatic synchronization between 3G and 4G services. The device may also restart a couple of times.

Return after 60 minutes and check the LEDs on both sides. All LEDs should be solid green.

LED Label	Description when solid Green
WAN	Successful connection to the local LAN
NET	Successful connection to Sprint's Core Network
GPS	GPS lock achieved
CDMA	3G CDMA Voice Services are available
LTE	4G Data Services are available
WIFI	WiFi Services are available

**NOTE:** If all LEDs are not solid green call Customer Care as described in [Getting help](#).

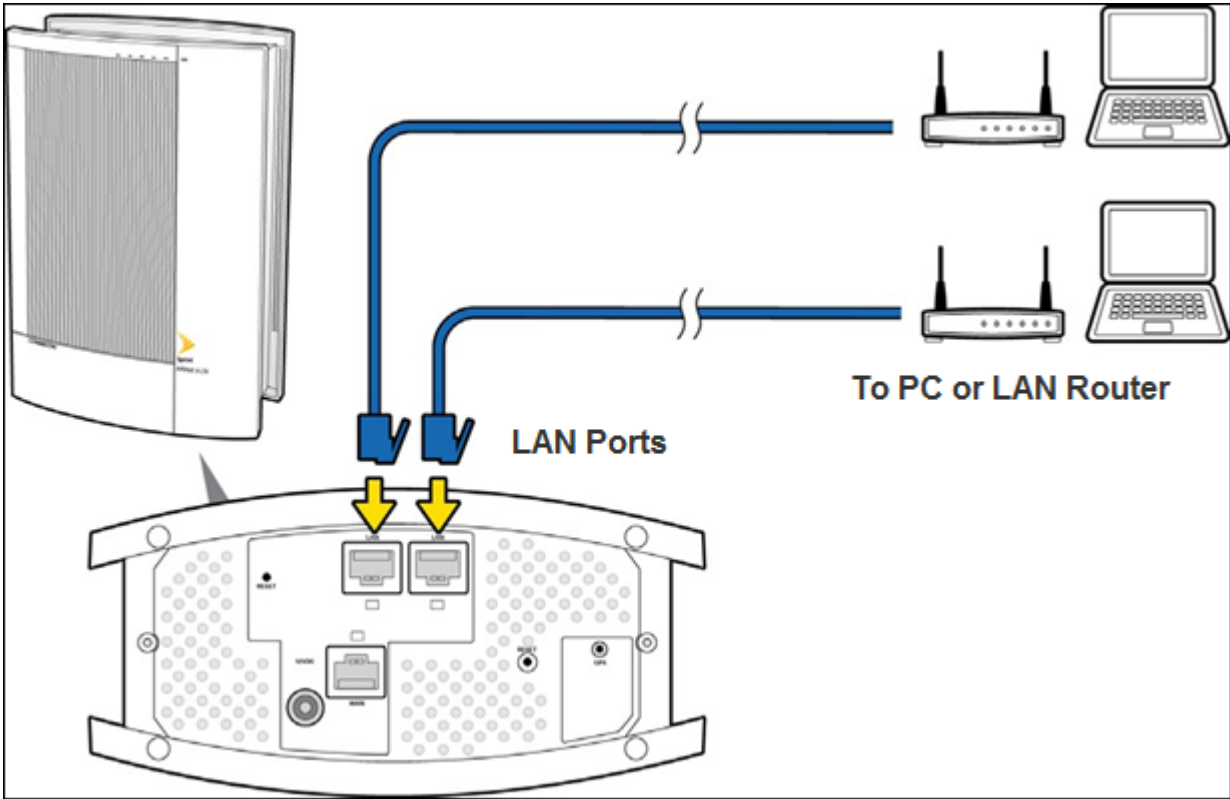
# Setting up optional components

## PC or LAN Router Setup

Connect a device that you have, such as a PC or a LAN router, to one of the AIRAVE's LAN ports.



To ensure the best service quality, always connect the LAN router to your AIRAVE. Do not connect it to the broadband connection device.



**NOTE:** If needed, use the Ethernet Coupler with an additional Ethernet cable to attach your PC, LAN router, or other device to the AIRAVE.



# Configuring the AIRAVE Router

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This section describes how to configure the AIRAVE's internal router.

- [Overview](#)
- [Logging in to the AIRAVE router](#)
- [Configuring WiFi service](#)
- [Adding your ISP User Name and Password](#)

## Overview

Your AIRAVE contains a built-in router. Usually, you can plug your AIRAVE into your broadband connection device, such as a cable modem, DSL modem or FIOS (a high-speed, fiber optic broadband Internet service), without performing any additional steps. However, you may need to configure the built-in router to work with your ISP modem or connection device.

The following table lists typical ISP setups and actions to take so that the built-in router works with your existing ISP setup.

Broadband connection device	LED display pattern	Symptom	Action to take
Cable modem	<b>WAN, LTE and WiFi solid green</b>	Not applicable (working properly)	Not applicable
DSL modem	<b>WAN LED blinking red</b>	Cannot access Internet	Go to <a href="#">Adding your ISP User Name and Password</a>
DSL modem with built-in router	<b>WAN led blinking red</b>	Cannot access Internet	See <a href="#">FAQs</a> .  If the problem persists, contact Customer Care as described in <a href="#">Getting help</a> .
DSL modem	<b>WiFi LED blinking red</b>	Cannot access Internet	Go to <a href="#">Configuring WiFi service</a> .

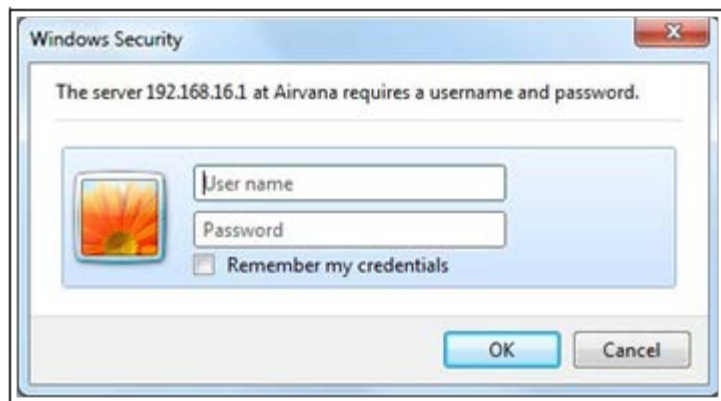
# Logging in to the AIRAVE router

1. Connect a computer to the AIRAVE LAN ports.
2. Start the computer. (If it is already running, restart it.)
3. In a web browser, enter the following URL:

http://192.168.16.1

**NOTE:** This IP address is the LAN bridge IP address.

The login dialog box appears.



4. Enter the User name 'admin' and the Password 'admin'.
5. Click **OK**.

**NOTE:** If you cannot connect to the router, diagnose the problem using the steps in section [Router connection problems](#).

## Home page

When connected to the router, the Router Status screen appears as shown below.





## Main menu

The main menu, on the top of the screen, contains a menu bar to access the major screens.

The main menu also contains the following buttons:

- **Log Out** - When finished, click this button to log out.
- **Help** - Located at the bottom of the screen, click to view help for the current screen.

## Navigation and data input

Use the menu bar on the top of the screen and the browser's Back button to navigate.

You must click **Save** before changing screens or the software does not save changes.

# Configuring WiFi service

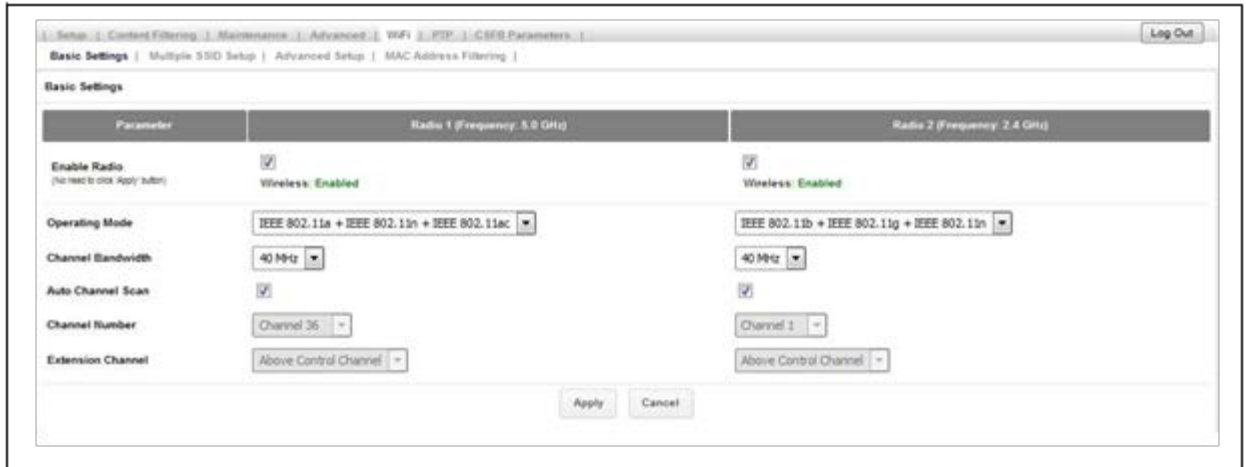
Follow this section to setup the AIRAVE's WiFi service. You will create and configure SSIDs in the router.

1. Log into the AIRAVE router by following the procedure in [Logging in to the AIRAVE router](#).
2. From the Home page click **WiFi** -> **Basic Settings**.

## Basic Settings

The Basic Settings tab allows you to enable and configure the two radios available in the AIRAVE.

Radio 1 has a frequency of 5.0 GHz and Radio 2 has a frequency of 2.4 GHz.



Parameter	Description
Enable Radio	Enable or disable Radio 1 and Radio 2
Operating Mode	<p>The following options are supported on Radio 1:</p> <ul style="list-style-type: none"> <li>• IEEE 802.11ac</li> <li>• IEEE 802.11n</li> <li>• IEEE 802.11a</li> </ul> <p>The following options are supported on Radio 2:</p> <ul style="list-style-type: none"> <li>• IEEE 802.11n</li> <li>• IEEE 802.11g</li> <li>• IEEE 802.11b</li> </ul>
Channel Bandwidth	<p>The following channel bandwidths are supported on Radio 1 and Radio 2:</p> <ul style="list-style-type: none"> <li>• 20MHz</li> <li>• 40 MHz</li> <li>• 80 MHz</li> </ul>

Auto Channel Scan	Check/uncheck the box to enable/disable auto channel scan.
Channel Number	This field shows the list of available channels under the respective radio.  <b>NOTE:</b> To select a channel manually, the Auto Channel Scan option must be disabled.
Extension Channel	Automatically selected based on the selected channel.  <b>NOTE:</b> For 2.4 GHz radio, this configuration will be enabled for selected channels, allowing the user to optionally select "Above Control Channel", or 'Below Control Channel'.

Mode	Channel Bandwidth	Data Rates
<b>Radio 1 (5 GHz)</b>		
IEEE 802.11ac	20 MHz	Up to 173.3 Mbps
	40 MHz	Up to 400 Mbps
	80 MHz	Up to 866.7 Mbps
IEEE 802.11n	20 MHz	Up to 72.2 Mbps
	40 MHz	Up to 150 Mbps
IEEE 802.11a	20 MHz	Up to 54 Mbps
<b>Radio 2 (2.4 GHz)</b>		
IEEE 802.11n	20 MHz	Up to 72.2 Mbps
	40 MHz	Up to 150 Mbps
IEEE 802.11g	20 MHz	up to 54 Mbps
IEEE 802.11b	20 MHz	Up to 11 Mbps

**NOTE:** It is recommended to keep the ACS (Auto Channel Select) feature checked. This feature ensures that the device will be able to select the most optimal available channel, even in a congested RF environment.

## Multiple SSID Setup

The AIRAVE router supports twelve SSIDs. Eight SSIDs are Private and user configurable; four are Public and configured only by the Operator.

- Click **Multiple SSID Setup**.

**NOTE:** Public SSIDs can only be enabled or disabled in the router. Public SSIDs are configured from the Operator.

Setup | Content Filtering | Maintenance | Advanced | WiFi | PTP | CSFB Parameters | Log Out

Basic Settings | **Multiple SSID Setup** | Advanced Setup | MAC Address Filtering |

List of SSIDs

Edit	Enable	SSID	SSID Status (5.0GHz - 2.4GHz)	Security Mode	Visibility	Max. Stations Per Radio
<input type="radio"/>	<input checked="" type="checkbox"/>	AIRV_3589	Enabled - Enabled	WPA2 - Personal	<input checked="" type="checkbox"/> Visible	16
<input type="radio"/>	<input type="checkbox"/>	cpe-WifiPvt2	Disabled - Disabled	WPA2 - Personal	<input checked="" type="checkbox"/> Visible	16
<input type="radio"/>	<input type="checkbox"/>	cpe-WifiPvt3	Disabled - Disabled	WPA2 - Personal	<input checked="" type="checkbox"/> Visible	16
<input type="radio"/>	<input type="checkbox"/>	cpe-WifiPvt4	Disabled - Disabled	WPA2 - Personal	<input checked="" type="checkbox"/> Visible	16
<b>PUBLIC SSIDs:</b>						
<input type="radio"/>	<input checked="" type="checkbox"/>	AIRV-PublicId1	Enabled - Enabled	WPA/WPA2 - Enterprise	Visible	16
<input type="radio"/>	<input checked="" type="checkbox"/>	AIRV-PublicId2	Enabled - Enabled	WPA/WPA2 - Enterprise	Visible	16

**Notes / Instructions:**

1. To edit any SSID (except primary SSID), you must disable it.
2. SSID, Passphrase or Radius Server Shared Secret must consist of alphabets, numbers & special characters such as ! # \$ + . ? @ \_ only.
3. The PUBLIC SSIDs are not configurable. These SSIDs can only be enabled/disabled.
4. The value specified for Max. Stations is per Radio basis and not per SSID basis.  
For eg: If the value for Max. Stations is configured as 5, then the Maximum number of stations allowed for that SSID is 5\*5 i.e. 10 stations.

Parameter	Description
SSID	The name of the network to which a device associates.
Enable	To enable/disable a SSID, check/uncheck the box for the SSID. Click <b>Apply</b> .
Status	Shows the status of a SSID per Radio.
Security Mode	Shows the security mode in which the SSID is currently operating. By default, the security mode is WPA2-Personal for Private SSIDs.
Visibility	To enable/disable SSID broadcasts, check/uncheck the box for each of the Private SSIDs and click <b>Apply</b> .

<p>Max. Stations Per Radio</p>	<p>This feature can be used to restrict the number of connections per SSID. A minimum of one station and a maximum of 128 stations can be specified per SSID.</p> <p>The maximum stations per radio is for the number of radios and not for SSIDs. For example, if the value of Max. Stations Per Radio is configured for 5, the maximum stations allowed for that SSID is 5 + 5, or 10 stations.</p>
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### To edit an SSID

1. Find the SSID you want to modify, disable it (uncheck the Enable box), then click **Edit**.
2. Use the following tables to configure the SSID, then click **Save Changes**.

The screenshot shows a web interface for editing an SSID. At the top, there is a breadcrumb trail: Setup | Content Filtering | Maintenance | Advanced | **WiFi** | PTP | CSFB Parameters | Log Out. Below this, there are links for Basic Settings | **Multiple SSID Setup** | Advanced Setup | MAC Address Filtering |. The main heading is 'Edit SSID Details'. The form is divided into sections: 'SSID Setup' with a text field for 'SSID' containing 'AIRV\_3599'; 'Wireless Security' with 'Security Mode' set to 'WPA2 - Personal' and 'Cipher Type' set to 'CCMP'; and 'WPA2 - Personal' with 'Passphrase' set to 'supersecret' (with a note: '(This field must have 8 to 63 ASCII characters)') and 'Group Re-keying Interval' set to '600' seconds. At the bottom, there are 'Save Changes' and 'Cancel' buttons.

Parameter	Description
<b>SSID Setup</b>	

SSID	<p>The name of the network to which a device can associate. SSID must be in the range of 1 to 32 characters, and must be unique.</p> <p><b>NOTE:</b> If you want to change the name of the SSID, change the text of the SSID text box, then click Save Changes. All SSID values will remain the same; only the name will change.</p>
<b>Wireless Security</b>	
Security Mode	<p>The security mode in which the SSID is currently operating.</p> <p>Valid values:</p> <ul style="list-style-type: none"> <li>• open</li> <li>• WPA-Personal</li> <li>• WPA-Enterprise</li> <li>• WPA2-Personal</li> <li>• WPA2-Enterprise</li> <li>• WPA/WPA2-Personal</li> <li>• WPA/WPA2-Enterprise</li> </ul> <p><b>NOTE:</b> For Enterprise versions, a RADIUS server based security check is performed.</p> <p>You will enter these values for Radius Server:</p> <ul style="list-style-type: none"> <li>• Server IP Address (A.B.C.D)</li> <li>• Server Port (Range: 1 to 65535, Default: 1812)</li> <li>• Server Shared Secret (WAP to Radius Server)</li> <li>• Server re-keying interval; this is the time after which the key must be re-generated. (Range: 600 to 7200 seconds, 0 - disable, Default: 600 seconds)</li> </ul>
Cipher Type	<p>This field can be set to one of the following options:</p> <ul style="list-style-type: none"> <li>• TKIP - Temporal Key Integrity Protocol</li> <li>• CCMP - Counter Mode CBC MAC Protocol</li> <li>• TKIP &amp; CCMP</li> </ul>

<Security Mode> - Personal	
Passphrase	Password required to associate with AP. This can be 8-63 ASCII characters.
Group Re-keying interval	The period of time between automatic changes of the group-key with the devices on the network.

## SSID IP configuration

To configure the IP address and subnet for an SSID, navigate to **Advanced -> LAN IP Setup**. On this page, you can view the various subnets, including the default IP address range and subnet mask, for every WiFi SSID. You can edit these fields for each SSID by clicking the **Edit** button for the SSID and entering new values.

The screenshot shows the LAN IP Setup configuration page. At the top, there are navigation tabs: Setup, Content Filtering, Maintenance, Advanced, WiFi, PTP, CSFB Parameters, and a Log Out button. Below the tabs, there are links for Dynamic DNS, LAN IP Setup, and QoS Setup. The main content area is titled 'List of Subnets' and contains a table with the following data:

SSID	IP Address	Subnet Mask	Starting IP	Ending IP	Edit
AIRV_3C77	192.168.17.1	255.255.255.0	192.168.17.10	192.168.17.200	Edit
cpe-WifiPvt2	192.168.18.1	255.255.255.0	192.168.18.10	192.168.18.200	Edit
cpe-WifiPvt3	192.168.19.1	255.255.255.0	192.168.19.10	192.168.19.200	Edit
cpe-WifiPvt4	192.168.20.1	255.255.255.0	192.168.20.10	192.168.20.200	Edit
AIRV-TEST1	192.168.21.1	255.255.255.0	192.168.21.10	192.168.21.200	Edit
AIRV-TEST2	192.168.22.1	255.255.255.0	192.168.22.10	192.168.22.200	Edit

Below the table is a 'Lan Interface Details' section with a table for LAN configuration:

Interface	IP Address	Subnet Mask	Starting IP	Ending IP	Edit
LAN	192.168.16.1	255.255.255.0	192.168.16.10	192.168.16.200	Edit

At the bottom, there is a checkbox for 'Default DMZ Server' and input fields for IP address components: 192, 168, 16, 205, and an 'Apply' button.

Parameter	Description
SSID	The name of the SSID
IP Address	The configured IP Address for the router for the SSID. Format: <A.B.C.D>

Subnet Mask	The configured subnet mask for the router in the SSID This is calculated by the router based on the IP Address.  Format: <A.B.C.D> Default: 255.255.255.0
Starting IP	The starting range of the reserved pool of IP Addresses for this SSID.
Ending IP	The ending range of the reserved pool of IP Addresses for this SSID.
Edit	Click this button to edit the configuration for the SSID.
<b>Lan Interface Details</b>	
SSID	<b>NOTE: All parameters described above apply to the SSID for the Local Area Network (LAN).</b>
Default DMZ Server	When checked, the IP Address for this "Demilitarized zone" is the default server. The IP Address can be configured.  <b>NOTE: Use this cautiously, as there are security issues associated with a DMZ server.</b>
Apply	Click this button to commit the configuration.

## Advanced Settings

On the WiFi Advanced Setup page you can configure some WiFi advanced parameters such as Beacon Interval, Transmit Power and Block DFS channel. Generally, no configuration change is required on this page.

The screenshot shows the 'Advanced Settings' section of the WiFi configuration interface. It features a table with three columns: 'Parameter', 'Radio 1 (Frequency: 5.9 GHz)', and 'Radio 2 (Frequency: 2.4 GHz)'. The parameters listed are 'Beacon Interval (in ms)', 'Transmit Power', and 'Block DFS Channels'. For Radio 1, the Beacon Interval is set to 600, and Transmit Power is set to High. For Radio 2, the Beacon Interval is set to 100, and Transmit Power is set to High. The 'Block DFS Channels' checkbox is checked for Radio 1 and marked as 'Not Applicable' for Radio 2. 'Apply' and 'Cancel' buttons are located at the bottom of the settings area.

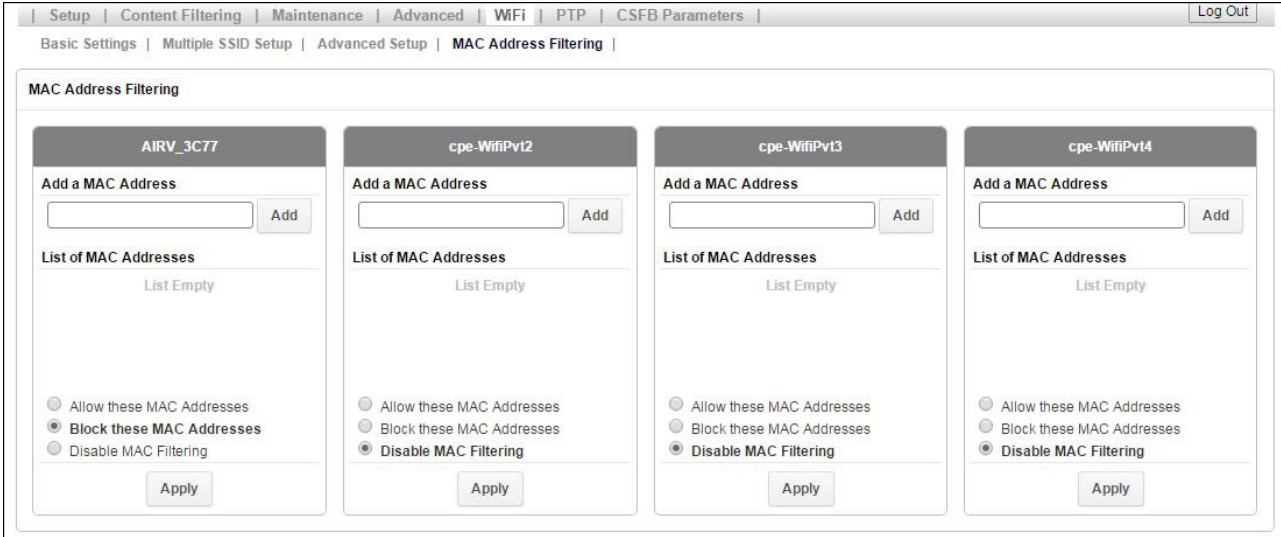
Parameter	Description
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<p>Beacon Interval</p>	<p>Specifies the time in which a beacon packet must be broadcast.</p> <p>By default, all the SSIDs will be beacons at an interval of 100msec. (Range: 50 msec to 3500 msec)</p>
<p>Transmit Power</p>	<p>This defines the strength of the signal being transmitted from a radio.</p> <p>By default, both the radios will be transmitting at the highest Transmit Power.</p>
<p>Block Dynamic Frequency Selection (DFS) Channels</p>	<p>This option allows the Auto Channel Selection (ACS) mechanism to either select/unselect DFS channels.</p> <p>The following channels are classified as DFS channels: 52,56,60,64,100,104,108,112,116,120,124,128,132,136,140</p> <p>By default, the 5GHz radio will block all the DFS channels. One can enable the use of these channels by unchecking the checkbox and applying the settings.</p> <p><b>NOTE:</b> It is NOT recommended to use these channels.</p>

### MAC Address Filtering

This feature is used to ALLOW or BLOCK MAC addresses from associating with a Private SSID. By default, this feature is DISABLED on every Private SSID.



Parameter	Description
Add a MAC Address	To add a MAC address in the list, enter a valid MAC address in the text field provided under a SSID and click <b>Add</b> .
List of MAC Addresses	Displays the list of MAC addresses added.
MAC Command	<p>This option is used to select the operation for the MAC addresses added in the list.</p> <ul style="list-style-type: none"> <li>• Allow these MAC Addresses – used to ALLOW only the MAC addresses added to the list</li> <li>• Block these MAC Addresses – used to BLOCK only the MAC addresses added to the list</li> <li>• Disable MAC Filtering – used to DISABLE MAC Address Filtering</li> </ul>

## Adding your ISP User Name and Password

If you are using a DSL modem and your device cannot connect to the Internet, you may need to enter your ISP account user name and password so that the AIRAVE can connect to the Internet.

You will use the User Interface of the AIRAVE internal router to configure this information.



Before you begin, obtain your ISP user name and password. Contact your ISP if you do not have this information.

1. Log into the AIRAVE router by following the procedure in [Logging in to the AIRAVE router](#).
2. Click the **Setup** tab on the Router status menu bar.
3. Click **WAN Settings**.



4. Ensure that **Yes (PPPoE)** is selected.

Does Your Internet Connection Require a Login?

Yes (PPPoE)

No (DHCP)

Encapsulation PPPoE (PPP over Ethernet) ▼

5. Enter your ISP user name in the Login box and your password in the Password box. Select authentication type (PAP, CHAP) from the drop down menu. Enter the Service name information if you have it. Click **OK**.

Authentication Type CHAP ▼

Service Name (If Required)

6. Accept the defaults in other fields on the screen. Click **Apply**.

**Internet IP Address**

Get Dynamically From ISP

Use Static IP Address

IP Address  .  .  .

**Domain Name Server (DNS) Address**

Get Automatically From ISP

Use These DNS Servers

Primary DNS  .  .  .

Secondary DNS  .  .  .

When the WAN LED is solid green your Internet connection is available. If setting up PPPoE takes more than 15 minutes at startup, the WAN LED will turn solid red. Once the PPPoE connection is set up, the LED turns solid green. If the LED remains solid red, contact your ISP.

# Using the AIRAVE

---

This chapter describes how the AIRAVE works at a high-level, and provides maintenance guidelines.

- [How the AIRAVE works](#)
- [Maintenance](#)

## How the AIRAVE works

The AIRAVE is a small cell base station with a radio unit that is similar to a cell tower radio. The base station uses a low-power antenna to transmit data cellular signals in your small and medium business locations.

Base stations give you better cellular coverage because they provide a stronger signal. A strong signal can extend battery life. Also, data applications on Smartphones and other mobile email devices, work faster.

### WiFi

The AIRAVE 3 LTE has an internal router that supports dual band radios (2.4GHz and 5GHz). Each radio supports 6 Virtual Access Points (VAP), 2 public and 4 private. Both radios share SSIDs that are not editable across VAPs.

Users with dual band radio capable receivers will reap the benefits of shared SSID and security credentials, and will enjoy a high quality user experience.

Users who travel out of range will migrate to the 2.4 GHz Radio band, and users near the AIRAVE will migrate to the 5GHz Radio Band to utilize higher data rates.

### Broadband connection

The AIRAVE connects to an Operator's network through a broadband Internet connection.

#### Connection speed

The AIRAVE's actual transmission speed is only as fast as the maximum broadband connection speed. Internet congestion, the number of users on the provider's network, and other factors can decrease the actual broadband connection speed. Individual bandwidth needs vary per customer. CommScope recommends a minimum of 3 Mbps downstream and 1.8 Mbps upstream for data services.

The following table shows recommended bandwidth by usage type:

Usage Type	Recommended Download Speed	Recommended Upload Speed
Wireless Data	Up to 3 Mbps per session	Up to 1.8 Mbps per session

# Maintenance

With normal use, AIRAVE is maintenance-free. Follow the recommendations below to ensure that it runs optimally.

## Ventilation

The AIRAVE has ventilation slots that work best if you don't block the flow of air to them. For desk mounted devices, keep the device at least 2 inches (5 cm) from walls and other surfaces to ensure proper air flow.

## Cleaning

Dust the AIRAVE occasionally to keep air vents clear of debris. Do not use liquid cleaners.

# Troubleshooting

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This chapter contains tips and procedures to help you troubleshoot your AIRAVE.

- [Troubleshooting installation problems](#)
- [Router connection problems](#)
- [LED quick reference](#)
- [Using LEDs](#)
- [Setting the AIRAVE to factory defaults](#)
- [FAQs](#)
- [Getting help](#)

## Troubleshooting installation problems

If your Broadband turns solid red after 15 minutes, reversing the order of turning on the AIRAVE and your broadband connection device can often resolve this problem.

To reverse the order, follow these procedures:

1. Unplug all cables, including power cables from all devices. You can unplug devices in any order.
2. Connect all Ethernet and GPS cables as described in [Setting up your AIRAVE](#).

### **Do not connect any power cables at this point in the procedure**

3. Plug the AIRAVE into an electrical outlet, preferably a surge protected outlet.
4. Wait 4 minutes.
5. Plug your broadband connection device into an electrical outlet.



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You may want to consult the documentation of your broadband connection device for any special procedures for connecting a device directly to your broadband connection device.

**NOTE:** If the WAN LED turns solid red after 15 minutes, call [Customer Care](#) as described in [Getting help](#).

# Router connection problems

If you cannot connect to the AIRAVE router, there may be a problem with the router, use the following procedures to diagnose the problem.

## Test for connectivity

If the router is properly installed, the LAN connection is OK, and it is powered ON, test the connection by using the Ping command:

- Open the command prompt window and enter the command:  

```
ping 192.168.16.1
```
- If no response is received, either the connection is not working, or your PC's IP address is not compatible with the router's IP Address.

## Verify IP addresses

If the PC is using a fixed IP address, its IP address must be within the range 192.168.16.2 to 192.168.16.254 to be compatible with the S1000 router's default IP address of 192.168.16.1. Also, the Network Mask must be set to 255.255.255.0.

- Refer to the CommScope S1000 Web GUI User Guide (913110) for details on checking the PC's TCP/IP settings.
- Ensure that your PC and the AIRAVE router are on the same network segment.
- Ensure you are using the wired LAN interface.

## Common connection types

Type	Details	ISP Data required
Dynamic IP Address	Your IP Address is allocated automatically, when you connect to your ISP.	Some ISPs may require a particular Hostname or Domain name, or MAC (physical) address.
Static (Fixed) IP Address	Your ISP allocates a permanent IP Address to you. Usually, the connection is "Always on."	The IP Address allocated to your PC, and related information, such as Network Mask, Gateway IP address, and DNS address.
PPPoE, PPPoA	Your PC connects to the ISP only when required. The IP address is usually allocated automatically.	User name and password are always required. If using a Static (Fixed) IP address, you need the IP address and related information (Network Mask, Gateway IP address, and DNS address).

IPoA (IP over ATM)	Normally, the connection is Always on.	The IP Address allocated to your PC and related information, such as Network Mask, Gateway IP address, and DNS address.
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## LED quick reference

Each side of the AIRAVE has a set of LEDs specific to Data or Voice services.

The NET, GPS, and WAN LEDs appear on each side of the device, and function similarly for Data and Voice services.





# Using LEDs

Use the LEDs to troubleshoot your device.

LED	Display pattern	Action to take
WAN	<b>Solid Green</b>	None. The WAN port is connected to a peer and has obtained an IP address over the local network.
	<b>Solid Red</b>	Hardware problem or connection problem. Contact Customer Support as described in <a href="#">Getting help</a> .
	<b>Blinking Red</b>	Wait. Your device is initializing.
	<b>Off</b>	Wait. The software is loading.
NET	<b>Solid Green</b>	None. The IPSec tunnel is established to the Operator's core network and is functioning properly.
	<b>Solid Red</b>	The IPSec tunnel to the Operator's core network is down, or has not established a connection (more than 15 minutes), or a hardware error occurred during startup. Contact Customer Care as described in <a href="#">Getting help</a> .
	<b>Blinking Red</b>	Wait. The IPSec tunnel to the Operator's core network is establishing a connection. The tunnel may have gone down for less than 15 minutes. Contact Customer Care as described in <a href="#">Getting help</a> .
	<b>Off</b>	Wait. The software is loading.
GPS	<b>Solid Green</b>	None. The GPS has acquired a lock and is ready.
	<b>Solid Red</b>	GPS error. GPS Time Fix has not been achieved since boot-up or DSP reload (30 minutes or more). Contact Customer Care as described in <a href="#">Getting help</a> .
	<b>Blinking Red</b>	Wait. The GPS is acquiring a lock.
	<b>Off</b>	Wait. The software is loading.
LTE	<b>Solid Green</b>	None. LTE service is up.
	<b>Solid Red</b>	Service error. LTE service has not come up (30 minutes or more), or a hardware error occurred during startup. Contact Customer Care as described in <a href="#">Getting help</a> .

	<b>Blinking Red</b>	Wait. LTE service is initializing.
	<b>Off</b>	The LTE service sector has been turned off by the Operator.
<b>WIFI</b>	<b>Solid Green</b>	None. The 2.4 GHz, 5.0 GHz or both WiFi services are up.
	<b>Solid Red</b>	Service error. WiFi service has not come up (30 minutes or more), or a hardware error occurred during startup. Contact Customer Care as described in <a href="#">Getting help</a> .
	<b>Blinking Red</b>	Wait. WiFi service is initializing.
	<b>Off</b>	WiFi service has been turned off either by the Operator or via local device GUI.
<b>CDMA</b>	<b>Solid Green</b>	None. The Voice service is up.
	<b>Solid Red</b>	Voice services error. The CDMA service has not been up for more than 30 minutes. Contact Customer Care as described in <a href="#">Getting help</a> .
	<b>Blinking Red</b>	Either the Voice service is coming up, or the Voice service has been down for 15 minutes. Wait 15 minutes. If the Voice service does not come up, contact Customer Care as described in <a href="#">Getting help</a> .
	<b>Off</b>	The Voice service has been turned off by the Operator.
<b>ALL</b>	<b>Solid Red</b>	Hardware error. A hardware error or hardware self-test occurred during startup. Contact Customer Care as described in <a href="#">Getting help</a> .

# Setting the AIRAVE to factory defaults

## RESET buttons

The AIRAVE has 2 RESET buttons on the bottom of the unit, as shown in the following diagram.

### Voice Services

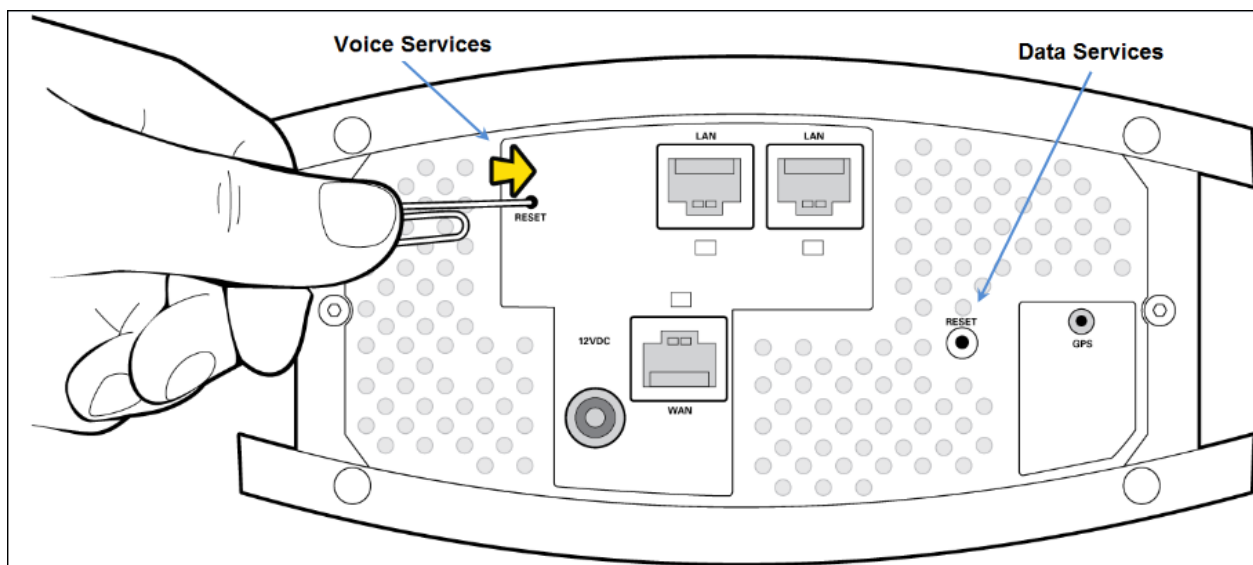
Pressing the *Voice Services* RESET button for more than 4 seconds sets the cFAP back to factory defaults.

**NOTE:** During this reset, LTE Data services should not be impacted if the LTE Data service is up.

### Data Services

Pressing the *Data Services* RESET button for more than 4 seconds sets the S1000 back to factory defaults.

**NOTE:** During this reset, Voice services will be impacted.



## When to do a reset

If your AIRAVE operates properly for an extended period and the WAN LED on either side of the device starts blinking red, the AIRAVE may have a problem requiring a reset.

If the WAN LED on the DATA side of the device suddenly starts blinking red, the S1000 may have a problem requiring a reset. Press the *Data Services* RESET button for more than 4 seconds to invoke a factory default of the S1000. Wait at least 10 to 15 minutes after the reset for the S1000 to be fully functional.

**!** If you press the Data Services RESET button, wait at least 4 minutes before attempting to do another reset, if needed.

If the WAN LED on the VOICE side starts blinking red, the cFAP may have a problem requiring a reset. Press the *Voice Services* RESET button for more than 4 seconds to invoke a factory default of the cFAP.

After resetting, your AIRAVE goes through an automated setup sequence. Refer to [Begin Self-Installation](#) for the setup sequence.

If the failure persists after resetting the AIRAVE, contact Customer Care. Refer to [Getting help](#).

# FAQs

## Why does the AIRAVE need an external GPS antenna?

The AIRAVE uses an external GPS antenna so that it can:

- Synchronize properly with the rest of the Operator's network.
- Determine and select the correct radio frequencies available in your area so that the AIRAVE uses the correct ones.

## What should I do if the GPS fails to acquire a lock?

If the GPS LED on both sides of the device does not turn solid green after 2 hours, call Customer Care as described in section [Getting help](#).

## What happens to the AIRAVE if there is a power outage or if you lose Internet access?

During a power outage your device will not be operational. When power is restored and your internet connection comes up, your device will resume data and voice services. If your device does not resume services, contact Customer Care as described in [Getting help](#).

## Can you move the AIRAVE to another location?

Yes, you can move your device to another location within the Sprint network. Contact Customer Care for assistance. See [Getting help](#).

## I have a DSL modem and cannot connect to the Internet

If you are using a DSL modem and your AIRAVE cannot connect to the Internet, you may need to enter your Internet service provider (ISP) account user name and password so that the device can connect to the Internet. See [Adding your ISP User Name and Password](#).

You may also need to adjust the WiFi settings. See [Configuring WiFi service](#).

## My calls work fine outside but drop indoors

If you notice poor coverage indoors, check the CDMA, LTE, and WIFI LEDs.

If you see a solid or blinking red WIFI LED you may need to adjust the WiFi settings. See [Configuring WiFi service](#).

If the CDMA or LTE LEDs are solid or blinking red call Customer Care. See [Getting help](#).

# Getting help

If you need help with your AIRAVE, contact Customer Care.

- Online at [sprint.com/airave](https://sprint.com/airave)
- By Phone: Sprint Customer Care (888-206-3585)
- **NOTE:** Call your Internet Service Provider for Internet access troubleshooting.

# Safety information

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This chapter contains safety information for your AIRAVE 3 LTE.

## General precautions

- Dust the AIRAVE occasionally to keep air vents clear of debris. Do not wash it.
- The AIRAVE has ventilation slots that work best if you don't block them. Keep the AIRAVE at least 2 inches (5 cm) from walls and other surfaces to ensure proper air flow.
- Do not operate the AIRAVE in an extremely dusty or humid environment.
- Avoid placing the AIRAVE near radiators or other heating sources.
- Avoid locating the AIRAVE where it could be exposed to direct sunlight for prolonged periods.
- Do not connect the AIRAVE to a power strip containing an excessive number of other devices.
- Although your AIRAVE is quite sturdy, it is a complex piece of equipment and can be broken. Avoid dropping, hitting, bending, or sitting on it.
- Do not immerse the AIRAVE in water or get it wet. If your device does get wet, unplug it immediately until it dries.
- Do not allow children to play with the AIRAVE. They could hurt themselves and others or damage the device.

**!** For the best care of your AIRAVE, only Sprint-authorized personnel should service your device and accessories. Failure to do so may be dangerous and voids your warranty.

## FCC information

FCC ID: QHY-S1000C

### ! FCC radiation exposure statement

This device complies with FCC's RF radiation exposure limits set forth for an uncontrolled environment under the following conditions:

- This device should be installed and operated such that a minimum separation distance of 8 inches (20 cm) is maintained between the radiator (antenna) and the user's or nearby person's body at all times.
- This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For more information, see the publication Femtocells and Health at [femtoforum.org](http://femtoforum.org) or visit the FCC website at [fcc.gov](http://fcc.gov).

## **FCC Part 15**

This device 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 device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause harmful interference to radio or television reception, which can be determined by turning the device off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Re-orient or relocate the receiving antennas of other devices.
- Increase the separation between the AIRAVE and other device receivers.
- Connect the AIRAVE into an outlet on a circuit different from that to which the other device receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.