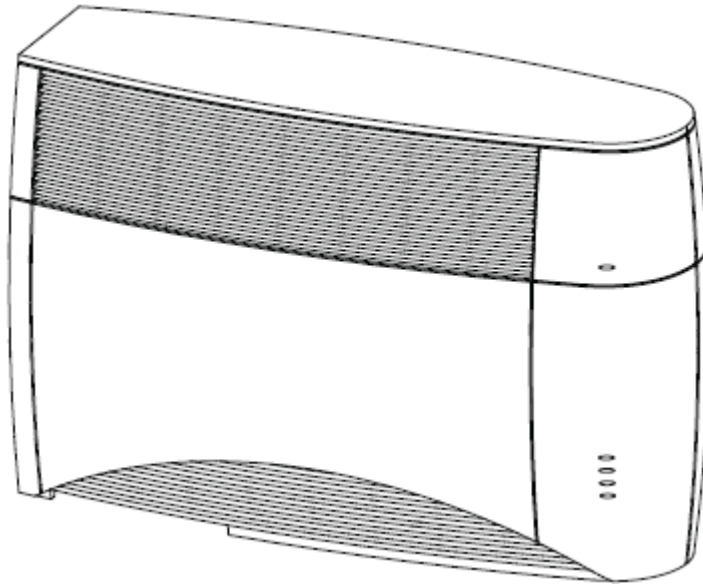


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AIRAVE™

User Guide



The Airvana Technical Publication team welcomes your questions and comments about the documentation.
Please send your feedback to:

TechPubs@airvana.com

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How AIRAVE works

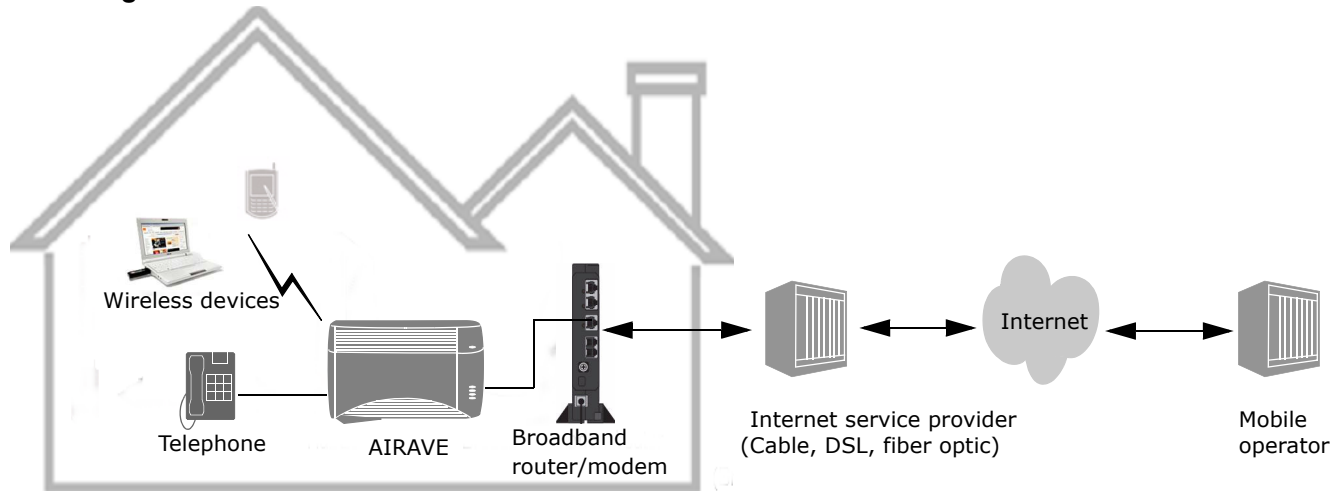
AIRAVE™ is a *femtocell*, a personal base station with a radio unit that is similar to a cell tower radio. Femtocells use a low-power antenna to transmit voice and data cellular signals in your home or small office.

Femtocells give you better cellular coverage, which means a stronger signal and improved voice quality. Also, data applications on smartphones, such as mobile e-mail devices, work faster.

AIRAVE connects to your mobile operator's network through your broadband internet connection. Outgoing calls go from AIRAVE over a secure connection to your mobile operator; incoming calls reverse this route.

If you have subscribed to VoIP phone service, you can use the Analog Telephone Adaptor (ATA) component in AIRAVE. This component converts a telephone message to a digital message and sends it over the Internet as Voice over IP (VoIP).

How calls go over the internet



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Setting up AIRAVE

NOTE: See the Getting Started poster for detailed illustrations on setting up AIRAVE.

Check what's in the box:



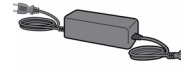
AIRAVE



External
GPS antenna



Ethernet cable



Power adapter
(AC100V)



Getting Started &
User Guide

- 1 Place AIRAVE near an exterior window and near your broadband modem/router.

NOTE: Do not place AIRAVE:

- Within two feet of major electrical appliances.
 - In direct sunlight.
 - Within two feet of heat or a heating device.
- 2 Connect one end of the yellow Ethernet cable (supplied) to an open LAN port on your broadband modem/router. Connect the other end of the Ethernet cable to AIRAVE's yellow WAN port.
 - 3 Connect the power adapter (supplied) to AIRAVE's base, and then plug the power adapter into an electrical outlet.

4 Observe AIRAVE's LEDs as it starts up:

- All indicators light up.
- Broadband, Mobile, and GPS blink and then turn solid green when the component is ready.
- VoIP Phone only lights up if you have subscribed for phone service.
- Voicemail will light up later when a message is available.



NOTE: It may take AIRAVE up to 30 minutes to pick up a GPS signal the first time you power it on. Subsequent startups take 10 minutes or less.

5 If the GPS LED does not light up after 30 minutes, use the external GPS antenna.

- a Connect the external GPS antenna to AIRAVE.
- b Place the external GPS antenna horizontally on a flat surface as close to a window as possible. The antenna works best in an open area where it can easily pick up signals.

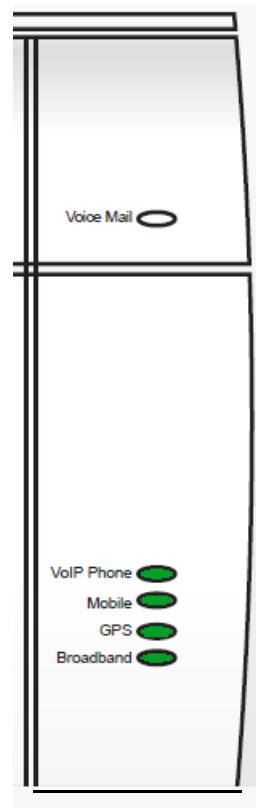
NOTE: Allow up to two hours for AIRAVE to be ready the first time you use it.

When Broadband, GPS, and Mobile are solid green, AIRAVE is ready for use.

6 Optionally, connect a computer or a home router to the AIRAVE LAN ports.

NOTE: Always connect the home router to AIRAVE. Do not connect it to the broadband modem/router.

7 Optionally, connect your telephone to the AIRAVE phone port.



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Checking AIRAVE's status

The following LEDs convey AIRAVE's status. See "Troubleshooting" on page 10 for other indicator behavior.

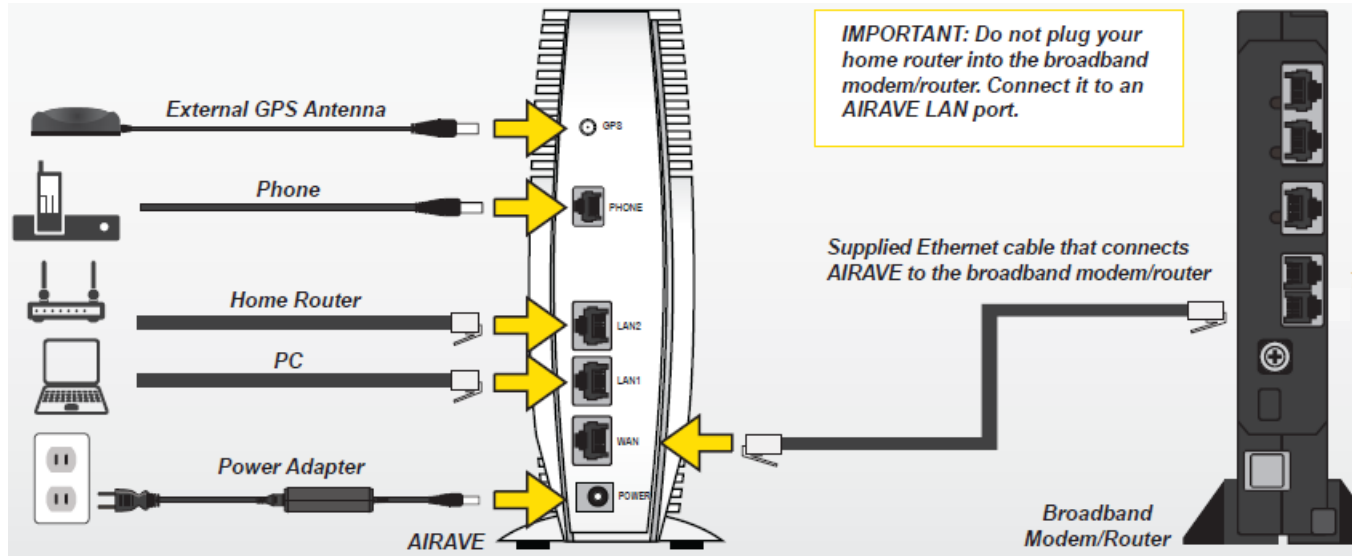
Indicator	Color	Solid color	Slow blink	Fast blink	Off
Voicemail	Green	N/A	Message waiting	N/A	No message
VoIP Phone	Green	Ready	Attempting to access service	N/A	You have not subscribed to VoIP phone service
	Amber	Power on self test (POST) failed or hardware problem	Service down has lasted 30 minutes	Service not available in that location or for that user	Service not available
Mobile	Green	Ready	Service down or starting up	Active; at least one call in progress	Service not available
	Amber	POST failed or hardware problem	Service down has lasted 45 minutes	N/A	Service not available
GPS	Green	GPS location and timing available	Acquiring a lock	N/A	N/A
	Amber	POST failed or hardware problem	N/A	N/A	N/A

Indicator	Color	Solid color	Slow blink	Fast blink	Off
Broadband	Green	Connected to the internet	Acquiring connectivity or starting up	N/A	N/A
	Amber	POST failed or hardware problem	Service down has lasted 30 minutes	N/A	No power or LED is defective
All	Amber	AIRAVE cannot pass a hardware self test. Call Customer Support as described in “Need help?” on page 28.			

Troubleshooting

If this LED...	Displays...	Take this action...
VoIP Phone	Slow blink green	If this persists, call Customer Support as described in “Need help?” on page 28.
	Solid amber	Plug the telephone line into a cordless phone and restart AIRAVE. You must cancel your land line service to plug AIRAVE directly into a telephone wall socket. If you have not canceled your land line service and you plug a telephone line from AIRAVE directly into a phone socket in the wall, AIRAVE’s phone service will not work.
Broadband	Slow blink green	Load a new web page on your PC to test for an active internet connection. If you cannot load a new page: <ul style="list-style-type: none">• There might be a problem with your internet service or modem/router. Ensure that DHCP is enabled on the broadband modem/router. If it is disabled, you must enable DHCP as described in your modem/router documentation.• You may need to add additional information as described in “Configuring the AIRAVE router” on page 12.
Mobile	Slow blink green	Wait. AIRAVE is out of service temporarily due to a software update.
GPS	Fast blink green	Wait. AIRAVE is trying to acquire another timing source. The LED may alternate between a slow and fast blink.
	Slow blink green	<ul style="list-style-type: none">• If you have not already done so, connect the external GPS antenna to AIRAVE.• If the external GPS antenna is already connected, move it to a different location, as close to a window as possible.

Setup at a glance



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Configuring the AIRAVE router

AIRAVE contains a built-in router. Usually, you can plug AIRAVE into your broadband modem/router without performing any additional steps. However, you may need to configure the AIRAVE router to work with your ISP modem or modem/router. The following table lists typical ISP setups and actions to take so that the AIRAVE router works with your existing ISP setup.

ISP broadband modem	LED behavior	Symptom	Take this action:
Cable modem	Broadband and Mobile solid green	N/A	N/A
DSL modem	Broadband LED slow blink green	Cannot access internet	Go to “Adding the ISP username and password” on page 13.
DSL modem with router	<ul style="list-style-type: none">• Broadband LED solid green• Mobile LED slow blink green	<ul style="list-style-type: none">• Cannot access internet• Cannot make a cell or VoIP phone call through AIRAVE	Try “Changing the AIRAVE router’s IP address” on page 15. If the problem persists, contact Customer Support.
Cable modem with router			
FiOS			

Adding the ISP username and password

If you are using a DSL modem and AIRAVE cannot connect to the internet, you may need to enter your internet service provider (ISP) account username and password so that the AIRAVE router can connect to the internet.

NOTE: Before you begin, obtain your ISP username and password. Contact your ISP provider if you do not have this information.

- 1 Connect a computer to one of the AIRAVE's LAN ports.
- 2 Enter the following path in your web browser:

192.168.1.1

The login dialog box appears.



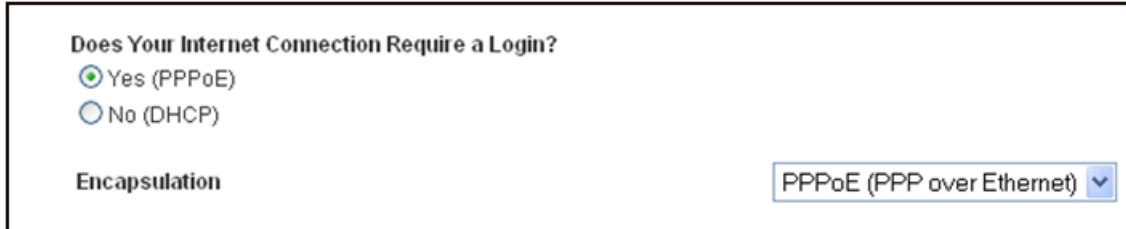
The screenshot shows a Windows-style dialog box titled "Connect to 192.168.1.1". The title bar is blue with a question mark icon and a close button. Below the title bar is a blue header area with a key icon. The main area is light beige and contains the following elements: the text "FC330A" at the top left; a "User name:" label followed by a dropdown menu showing "admin"; a "Password:" label followed by a text box containing five black dots; a checkbox labeled "Remember my password" which is currently unchecked; and two buttons at the bottom, "OK" and "Cancel".

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- 3 Enter username **admin** and password **admin**. Click **OK**.
- 4 Click the Setup tab on the Router status page menu bar. Click WAN Settings.



- 5 Ensure that **Yes** is selected in the **Does Your Internet Connection require a Login?** field.

The image shows a configuration form for the router. The title is "Does Your Internet Connection Require a Login?". There are two radio button options: "Yes (PPPoE)" which is selected with a blue dot, and "No (DHCP)". Below the radio buttons is the label "Encapsulation" followed by a dropdown menu showing "PPPoE (PPP over Ethernet)" with a downward arrow.

- 6 Enter your ISP user name (replacing the default Guest user name) and password. Click **OK**.

Login	<input type="text" value="Guest"/>
Password	<input type="password"/>

- 7 Accept the defaults in other fields on the screen. Click **Submit**.
- 8 Observe the Broadband LED. When it is solid green, your internet connection is available. If the LED is not solid green, contact Customer Support as described in “Need help?” on page 28.

Changing the AIRAVE router’s IP address

If you are using a DSL or Cable modem that includes an integrated router, or FiOS, IP address conflicts can occur with AIRAVE’s router. This can prevent you from connecting to the internet or making a call through AIRAVE. Resolve the conflict by changing the AIRAVE router’s IP address.

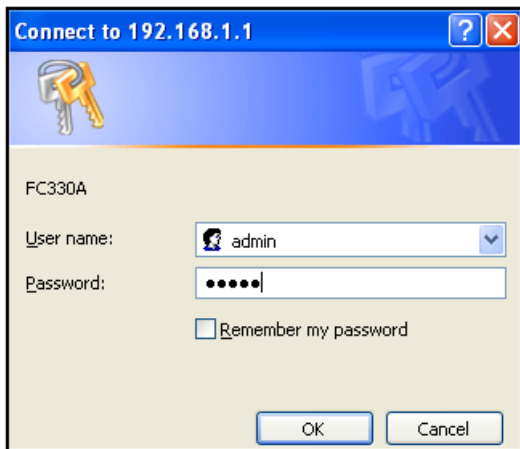
- 1 Determine if there is an IP address conflict by checking the home router IP address range. Refer to your home router’s documentation for accessing the router’s interface.
 - a Connect a computer to one of the home router’s LAN ports.
 - b As described in the home router’s documentation, enter the path to access the router. For example:
`192.168.1.1`
 - c Enter the username and password at the login dialog box.

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- d Check the router status to view the IP address setup. If the router's IP address range is:
- 192.168.1.x, this range conflicts with AIRAVE. Go to [step 2](#).
 - A different range, the problem is not due to IP address conflict. Contact Customer Support.
- 2 Connect a computer to one of the AIRAVE's LAN ports.
- 3 Enter the following path in your web browser:

192.168.1.1

The login dialog box appears.



- 4 Enter username **admin** and password **admin**. Click **OK**.

- 5 Click the Advanced tab on the Router status page menu bar. Click **LAN IP Setup** to display the following page:

Setup | Telephony | Content Filtering | Maintenance | **Advanced**

Dynamic DNS | **LAN IP Setup** | QoS Setup

LAN TCP/IP Setup

IP Address: 192 . 168 . 1 . 1

IP Subnet Mask: 255 . 255 . 255 . 0

Use Router as DHCP Server

Starting IP Address: 192 . 168 . 1 . 2

Ending IP Address: 192 . 168 . 1 . 254

Default DMZ Server: 192 . 168 . 1 .

Address Reservation

#	IP Address	Device Name
---	------------	-------------

- 6 In the **LAN TCP/IP** section, change the value in third box of the IP address.

NOTE: Record this new IP address. You use it whenever you log in to the AIRAVE router.

- 7 In the **User Router as DHCP Server** section, change the IP address range by changing the last two boxes in the Starting IP address and in the Ending IP address fields.

In the following example, the new router LAN IP Address is 192.168.17.1, and the range for devices attached to the AIRAVE router is now 192.168.17.2 through 192.168.17.254.

LAN TCP/IP Setup

IP Address

IP Subnet Mask

Use Router as DHCP Server

Starting IP Address

Ending IP Address

Default DMZ Server

Address Reservation

#	IP Address	Device Name
---	------------	-------------

- 8 Click **Apply**. The following dialog box appears:



- 9 Click **OK**.
- 10 Reboot the computer to implement the IP address changes.
- 11 If you have any devices attached to AIRAVE, you must stop and restart them so that they pick up a new IP address.
- 12 If you log in to the AIRAVE router again, use the new IP address. In this example, enter the following path in your web browser:

192.168.15.1

FAQ

Why does AIRAVE need a GPS antenna?

AIRAVE has a GPS antenna so that it can:

- Synchronize properly with the rest of your service provider's network.
- Provide its location for emergency calls.
- Determine and select the correct radio frequencies available in your area so that AIRAVE uses the correct ones.

Why does AIRAVE need an external GPS antenna?

The external antenna is only used if the internal GPS antenna cannot lock on the satellite signal. The external antenna lets AIRAVE lock on the greatest number of satellites.

What happens to AIRAVE if there is a power outage or if I lose internet access?

AIRAVE needs both a broadband internet connection and a constant power supply to work. During a power outage, your mobile device immediately tries to obtain cellular service through your service provider's normal cellular network.

Will AIRAVE work in the basement?

For best results, locating AIRAVE in the basement is not recommended.

Can you move AIRAVE to another location?

You can move AIRAVE to another location within the registered address (your home or office). However, you cannot move it to a different address.

AIRAVE care

With normal use, AIRAVE is maintenance free. See the following recommendations to ensure that it runs optimally.

Ventilation

AIRAVE has ventilation slots that work best if you don't block them. Keep AIRAVE at least two inches from walls and other surfaces to ensure proper air flow.

Cleaning

Dust AIRAVE occasionally to keep air vents clear of debris. You do not need to wash it.

External GPS antenna

If you use the optional external GPS antenna:

- Do not place the GPS antenna outdoors; it is not weatherproof.
- Do not place the GPS antenna behind large, heavy objects such as furniture; doing so could affect the signal.

Safety information

Emergency call limitations

AIRAVE supports emergency 911 (wireless 9-1-1 service) unless the device loses electrical power or internet access. If there is an electrical power outage, internet service failure, or other mobile service disruption, you may not be able to rely on AIRAVE to make emergency 911 calls. AIRAVE may work if you have an Uninterruptible Power Supply (UPS) backup system.

NOTE: Unregistered/unauthorized users can make emergency 911 calls over AIRAVE.

Radio frequency safety

AIRAVE transmits and receives radio frequency signals to send and receive calls. The level of radio waves that it emits is very low. Femtocells fall within the emissions limits that regulatory agencies permit for similar wireless products in your home, such as wireless routers and baby monitors.

For more information, see the publication *Femtocells and Health* at www.femtoforum.org.

General precautions

Do not immerse AIRAVE in water or get AIRAVE wet. If AIRAVE does get wet, unplug it immediately until it dries.

FCC notices

- Changes or modifications not expressly approved by Sprint could void the user's authority to operate the equipment.
- 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 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 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 one of the following measures:
 - Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
- FCC Radiation Exposure Statement

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

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

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Your broadband connection speed

- AIRAVE supports up to six simultaneous voice calls or a combination of voice calls and data sessions.
- AIRAVE can receive data and voice calls at a speed of 3Mbps and send data and voice calls at a speed of 1.8Mbps.

AIRAVE's actual transmission speed is only as fast as your maximum broadband connection speed. Internet congestion, the number of users on your provider's network, and other factors can decrease your actual broadband connection speed. To maximize AIRAVE's performance, we recommend a broadband connection speed of 3Mbps downstream and 1.8Mbps upstream.

Product specification

This section describes technical details about the product.

Item	Description
Air Interface	CDMA-2000 1x-EVDO CDMA-2000 1x-RTT
Frequency Band <i>CDMA-2000 1x-EVDO Service Radio</i>	US PCS (Band Class 1) Supported Channel Numbers (N): N =25, 50, 75..1175 – Transmit Frequency = $1930 + 0.05*N$ MHz – Receive Frequency = $1850 + 0.05*N$ MHz
RF Output Power Level <i>CDMA-2000 1x-EVDO Service Radio</i>	Range: +7dBm to -30dBm Tolerance: +/-2dBm
Frequency Band <i>CDMA-2000 1x-RTT Service Radio</i>	US PCS (Band Class 1) Supported Channel Numbers (N): N =25, 50, 75..1175 – Transmit Frequency = $1930 + 0.05*N$ MHz – Receive Frequency = $1850 + 0.05*N$ MHz
RF Output Power Level <i>CDMA-2000 1x-RTT Service Radio</i>	Range: +7dBm to -30dBm Tolerance: +/-2dBm


Item	Description
Frequency Band <i>CDMA-2000 1x-RTT Beacon</i>	US PCS (Band Class 1) Supported Channel Numbers (N): N =25, 50, 75..1175 – Transmit Frequency = $1930 + 0.05 \cdot N$ MHz – Receive Frequency = $1850 + 0.05 \cdot N$ MHz
RF Output Power Level <i>CDMA-2000 1x-RTT Beacon</i>	Range: +10dBm to -30dBm Tolerance: +/-2dBm
Capacity	Number of Simultaneous 1x-RTT Users: 6 Number of Simultaneous 1x-EVDO Users: 6
CDMA-2000 1x-EVDO Data Rate	Maximum Downlink Data Rate: 3.1 Mbps Maximum Uplink Data Rate: 1.8 Mbps
Physical Dimensions	Size: 265x50x175(mm)
	Weight: 680g (1.5 lbs)
Power Supply	External AC Adaptor AC Input Power: 100VAC±10% (50/60Hz), 1A max DC Output Power: 12VDC, 2.5A max

Item	Description
Interface	External GPS antenna connection port: MCX
	WAN Port Interface Type: 10/100BASE-T Connector: RJ-45
	LAN Ports: 2 Interface Type: 10/100BASE-T Connector: RJ-45
	ATA Telephone Port: Connector: RJ-11
	DC Power Supply Port: 2.5mm Power Jack
Environmental Condition	Operation temperature: 0 ~ 40° Celsius
	Operation humidity condition: 20 ~ 90% (non-condensing)
	Storage temperature: -20 ~ 70° Celsius
	Storage humidity condition 20 ~ 95% (non-condensing)

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Need help?

If you need help with AIRAVE, please contact us.

 Phone	24/7 AIRAVE Customer Support Line: 1-866-556-7310 (toll free)
Online	Product support and documentation are available online at the AIRAVE web site: www.sprint.com/airave

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User Guide, 910702, Rev02.04, Draft, January 2010