



Access Point

User's Guide

012-0001-00

FCC Compliance and Advisory Statement This hardware device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including 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 and, if not installed or 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 or more of the following measures: 1) reorient or relocate the receiving antenna; 2) increase the separation between the equipment and the receiver; 3) connect the equipment to an outlet on a circuit different from that to which the receiver is connected; 4) consult the dealer or an experienced radio/TV technician for help. Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulations.

Canadian DOC Statement This digital device does not exceed the Class B limits for radio noise emissions from digital apparatus specified in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Industry.

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Product Overview

Each Access Point supports tens of thousands of sensors and can simultaneously demodulate signals from up to 1000 sensors using a unique patented multiple access scheme. With 172 dB of total allowable path loss (FCC/IC regulatory regions) the ULP network can easily be deployed using a star topology configuration, overcoming the limitations of legacy wireless sensor networks (802.11, 802.15.4, 900 MHz FHSS) that require complicated mesh protocols to extend range or operate in a capacity limited simplex mode.

Enclosure Features

On-Ramp Wireless' Ultra-Link Processing™ Access Point is housed in a rugged weatherproof enclosure that is ideal for both indoor and outdoor applications. Constructed of heavy gauge aluminum, it is designed for high temperature and corrosive environments. The AP can be mounted in a vertical or a horizontal orientation.

The lid interior features a channeled gasket that provides environmental protection. The lid is secured to the housing with retained stainless steel heavy duty screws. For maintenance purposes, the lid can be opened (150 degree opening angle) for easy part replacement, or completely removed to provide additional servicing options.

Power-Over-Ethernet (PoE)

A CAT5 PoE interface is used to split the Data and Power carried by a CAT5 cable to the internal equipment. The interface includes Lightning Protection and support for normal and reverse polarity POE equipment. To supply the required current to the equipment, the HyperLink BT-CAT5-P1-4848 power supply and injector kit should be used. Cisco® PoE equipment requires substitution of a BT-CAT5-P1R4848 kit to supply 48 volt reverse polarity. An optional PoE interface surge protector can be added to add protection for a second CAT5 cable.

Lightning Protection

The PoE interface features built in lightning protection. This helps add an extra level of protection to PoE equipment installed in the enclosure. In addition, the unit can accept up to two optional bulkhead-mount N-Type lightning protectors to protect the coaxial cable runs. An additional PoE interface can be purchased for use in the enclosure.

Environmental/Operational Parameters

The Access Point was tested to ETSI EN 300 019-2-4 Specification T4.1 for non-weather-protected locations.

Manufacturer's Name: On-Ramp Wireless

Manufacturer's Address: 10920 Via Frontera, Suite 200, San Diego, CA 92127, USA

Declares our sole responsibility that the product:

Product Name: On-Ramp Wireless Access Point, ULPAP110

Conforms to the following Product Specifications:

Safety: IEC 60950-1:2005 (2nd Edition); AM 1:2009

UL 60950-1:2003 R7.06

CAN/CSA-C22.2 No. 60950-1-03

EMC: FCC Part 15, Subpart B, Class B

R&TTE Directive 1999/5/EC

ETSI EN 301 489-3 V2.4.1 (2002-08)

EN55022: 2006/A1 2007 Class B

EN 61000-3-2: 2006

EN 61000-3-3: 2008

EN 61000-4-3: 2006

EN 61000-4-2: 2009

EN 61000-4-4: 2004

EN 61000-4-6: 2009

ICES-003:2004 Class B

ANSI C63.4-2003

The product herewith complies with the requirements of the Low Voltage Directive 2006/95/EC, the EMC Directive 2004/108/EC and carries the CE marking. In addition, it complies with the WEEE Directive 2002/96/EC and RoHS Directive 2002/95/EC.

The product was tested in a typical configuration.

Flame Rating approvals:

- File #E206630, Listed UL 50, UL 508
- CSA Approved
- Det Norske Veritas File #8281.1/FERe
- Maritime Register of Shipping #83033.250

RoHS Compliant Yes

Installation

Professional Installation

The ULPAP110, and any associated equipment requires professional installation; a) installation of the equipment must be controlled, b) Installation must be performed by licensed professionals, c) installation of the equipment requires special training (special programming, field strength measurements and transmit power calculations) to meet FCC/IC guidelines.

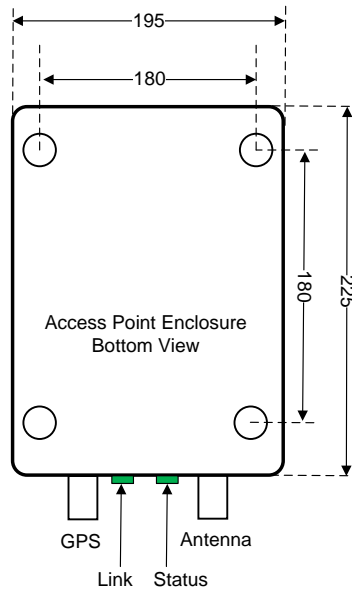


Figure 1: Mounting hole dimensions (cm)

Vertical Mounting

Wall Mount

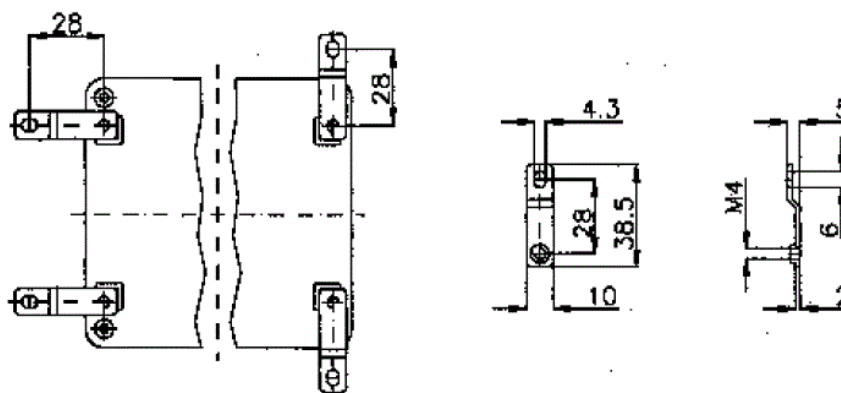


Figure 2: Mounting tabs installed on the AP

Note: Mount the AP directly to non-metallic wall studs if possible; do not secure the AP to a drywall surface. When stud spacing exceeds the AP's mounting dimensions, secure ½" plywood to the studs and secure the AP to the plywood mount.

1. Place the AP against the mounting location.
2. Drill a 3/16" hole through each of the mounting tabs and into the mounting surface.
3. Insert a ¼" x 1" wood screw thru each mounting tab and into the mounting surface.
4. Tighten each screw until it is secure against the mounting surface.
5. Ground the AP to an appropriate ground.

Pole Mount

1. Turn the AP upside down and orient it so that the antenna outputs face you (see Figure 3: Mounting hole dimensions (cm)). The mounting hole dimensions will be visible.
2. Place the slotted struts over the mounting holes. Orient the struts horizontally.
3. Slide a flat washer onto the 5/16" hex head thread cutting screw.
4. Insert the screw and washer thru the slotted struts and into the AP housing's mounting holes.
5. Using a 10mm nut driver, thread the screw into the mounting hole.
6. Tighten each screw until snug against the slotted strut.

Note: Avoid over-tightening the screws

7. When both slotted struts are secured to the AP enclosure, slide a 1 strut mount clamp (1" or 2" depending on the application) onto each slotted strut.
8. Once the strut mount clamps mounted on the struts, slide the AP onto the pole. Make sure that the antenna cables face downward.
9. Tighten the mounting clamp bolts so that the AP enclosure is secure against the pole.

Horizontal Mounting

Rack Mount

Orient the Access Point enclosure so that the antenna connectors and indicator lights are facing you.

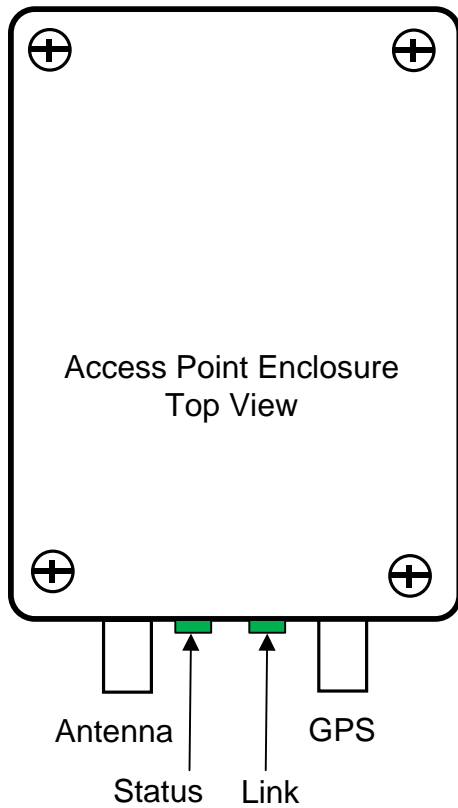
1. Loosen the 4 top cover securing screws using a flat-blade 5/16" X 6" screwdriver.

Note The top cover screws are retained

2. Lift the cover straight up and open it by lifting the right hand side.
3. Remove the two keeper screws located next to the hinge posts.
4. Lift the cover off of the enclosure and set aside.
 - a. Insert the keeper screws into their mounting holes and partially screw them down to avoid loss.
5. Using a ¼" x 4" flat blade screwdriver, loosen the mounting tabs.
6. Rotate the mounting tabs 90 degrees from their horizontal orientation to a vertical orientation.

- a. It may be necessary to offset the vertical orientation a few degrees from 0 vertical in order to align the mounting tabs with available thru holes in the rack tray.
7. Slide rack tray half way out of the rack.
8. Place the AP on the rack tray and align the mounting tabs so that they offer a clear mounting point.
9. Orient the unit so that the antenna connectors are facing you.
10. Place a ¼" x ½" screw into each mounting tab.
11. Secure a fixing nut, from the bottom of the rack tray, onto each screw and tighten the nut.
12. Slide the rack tray into the rack when the AP is secured to the rack tray.

Cabling



Connections

Connect GPS antenna cable to the GPS connector (Male)

Connect the Antenna cable to the antenna connector (Male)

Connect the Power (PoE) to the Access Point

Antenna Parameters

- The FCC sets maximums transmit power limits. The AP's maximum TX power capability is 30dBm.
- Maximum allowable Effective Isotropic Radiated Power (EIRP) for the professionally installed Access Point 36 dBm (4 watt).
- The Access Point transmit output power is adjusted, if required as part of a professional installation, using On-Ramp Wireless' Network Management Software.

This device has been tested with the antennas listed below, and having a maximum gain of 9 dBi. Antennas not included in this list or having a gain greater than 9 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

Table 1 Typical Antennas, FCC configuration

Manufacturer	Part Number	Gain	Type
L-com	HG2409UDT-PRO	9	Omni-Directional with 7° Down-Tilt

Additional equivalent antennas from other manufactures may be substituted and then marketed with this equipment. Equivalent antennas must be of the same type (e.g. Omni-Directional) and must be of equal or less gain (9 dBi) than an antenna previously authorized under the same FCC ID, and must have similar in band and out of band characteristics.

The output power at the antenna input must be measured and adjusted according to FCC guidelines. This measurement accounts for AP transmit power and any losses in cables and connectors prior to the input. The transmit power at the antenna input plus the antenna gain must not exceed 36 dBm (4W). When using the 9dBi antenna the measured power at the antenna input must be 27 dBm or lower to meet this requirement. When the antenna gain exceeds 6dBi the measured transmit power at the antenna input must be measured and the transmit power at the Access Point must be set appropriately.

Example 1:

1. The antenna gain is 9 dBi
2. Output power at antenna input measured at 29 dBm (30 dBm AP transmit power - 1 dB of cable loss)
3. $EIRP = 29 \text{ dBm} + 9 \text{ dBi} = 38 \text{ dBm} > 36 \text{ dBm}$ requirement
4. What should the AP maximum power be set to so the installation is within the FCC maximum EIRP?
5. $38 \text{ dBm} - 36 \text{ dBm} = 2 \text{ dBm}$. Max power at AP should be $30 \text{ dBm} - 2 \text{ dBm} = 28 \text{ dBm}$

When the antenna gain is less than or equal to 6 dBi the AP output power can be set at the full 30 dBm.

Example 2:

1. The antenna gain is 4 dBi
2. Output power at antenna input is 29 dBm (30 dBm AP transmit power - 1 dB of cable loss)
3. $EIRP = 29 \text{ dBm} + 4 \text{ dBi} = 33 \text{ dBm} < 36 \text{ dBm}$

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

The responsibility for staying within these power limits falls on the professional installer.

Safety information

- Always follow all warnings and instructions marked on the product.
- Use only the power source indicated on the product regulatory label.
- When storing or transporting this product, do not tilt or stand it on its side.
- Avoid placing this product in an environment that is subject to rapid changes in temperature or humidity, mechanical shocks, vibration, or dust.
- Do not use aerosol products inside or around this product.
- Do not attempt to repair or service this product.

Regulatory compliance

FCC statement The United States Federal Communications Commission (in CFR 47 Part 15.105) has specified that the following notice be brought to the attention of the users of this product:

Note: 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.

CAUTION:

Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this product not expressly approved by On-Ramp Wireless might cause harmful interference and void the FCC authorization to operate this product.

The radiated energy from this product is well below the FCC radio frequency exposure limits. Nevertheless, the product shall be used in such a manner that the potential for human contact during normal operation is minimized.

This product and any attached external antenna, if supported, shall be placed in such a manner to minimize the potential for human contact during normal operation. In order to avoid the possibility of exceeding the FCC exposure limits, human proximity shall not be less than 25 cm (8 inches) during normal operation.

Canadian statements

This product meets the applicable Industry Canada technical specifications.

This Class B digital apparatus complies with Canadian ICES-003.

This device complies with Industry Canada licence-exempt RSS standard(s). 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 the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.