AT-TQ4600-OF13

**Enterprise-class AT-TQ4600 Wireless Access Point
with IEEE802.11a/b/g/n/ac Dual Radio
and OpenFlow Protocol**

Installation Guide

Electrical Safety and Emissions Standards

This product meets the following standards:

Federal Communications Commission Interference Statement

Declaration of Conformity

Manufacturer Name: **Allied Telesis, Inc.**
Declares that the product: **Wireless access point with PoE+ powered device function**
Model Number: **AT-TQ4600**

This 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 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.

⚠️ **Caution**
FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. ∿ E80

⚠️ **Avertissement**
Avertissement de la FCC: Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser cet équipement. ∿ E80

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The band from 5600-5650MHz will be disabled by the software during the manufacturing and cannot be changed by the end user. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment

This Allied Telesis RoHS-compliant product conforms to the European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment. Allied Telesis ensures RoHS conformance by requiring supplier Declarations of Conformity, monitoring incoming materials, and maintaining manufacturing process controls.

Note
For additional regulatory statements, refer to Appendix B, "Regulatory Statements" on page 65.

Safety and Electromagnetic Emissions Certificates

Standard Compliance

- ❒ RoHS compliant
- ❒ European Union RoHS (Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.)

Certificates

- ❒ CE
- ❒ EAC
- ❒ FCC/IC
- ❒ KC
- ❒ RCM
- ❒ Wi-Fi CERTIFIED

Electromagnetic Compatibility (EMC)

- EN 301 489-1
- EN 301 489-17
- EN 55024
- EN 55032
- EN 61000-3-2
- EN 61000-3-3
- EN 61000-4-2
- EN 61000-4-3
- EN 61000-4-4
- EN 61000-4-5
- EN 61000-4-6
- EN 61000-4-8
- EN 61000-4-11
- AS/NZS CISPR 32
- FCC 47 CFR Part 15, Subpart B
- ICES-003

Medical (EMC)

- EN 60601-1-2

Radio Equipment

- EN 300 328
- EN 301 893
- AS/NZS 4268
- FCC 47 CFR Part 15, Subpart C
- FCC 47 CFR Part 15, Subpart E
- FCC part 2
- RSS210
- RSS-Gen
- RSS-102

Safety

- EN 60950-1
- IEC 60950-1
- TUV-T
- UL 60950-1

❏   UL 2043*

Note
* Refer to "Installation Requirements per UL 2043 Compliance" on page 34 for installation requirements.

Translated Safety Statements

Important: The ☞ indicates that a translation of the safety statement is available in a PDF document titled *Translated Safety Statements* on the Allied Telesis website at **www.alliedtelesis.com/support**.

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Preface

This guide contains the hardware installation instructions for the AT-TQ4600-OF13 wireless access point. The product consists of the AT-TQ4600 wireless access point and OpenFlow protocol (version 1.3). This preface contains the following sections:

❐ "Safety Symbols Used in this Document" on page 14

❐ "Contacting Allied Telesis" on page 15

Safety Symbols Used in this Document

This document uses the following conventions.

Note
Notes provide additional information.

Caution
Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.

Warning
Warnings inform you that performing or omitting a specific action may result in bodily injury.

Contacting Allied Telesis

If you need assistance with this product, you may contact Allied Telesis technical support by going to the Support & Services section of the Allied Telesis web site at **www.alliedtelesis.com/support**. You can find links for the following services on this page:

❐ 24/7 Online Support — Enter our interactive support center to search for answers to your product questions in our knowledge database, check support tickets, learn about Return Merchandise Authorizations (RMAs), and contact Allied Telesis technical experts.

❐ USA and EMEA phone support — Select the phone number that best fits your location and customer type.

❐ Hardware warranty information — Learn about Allied Telesis warranties and register your product online.

❐ Replacement Services — Submit an RMA request via our interactive support center.

❐ Documentation — View the most recent installation and user guides, software release notes, white papers, and data sheets for your products.

❐ Software Downloads — Download the latest software releases for your managed products.

For sales or corporate information, go to **www.alliedtelesis.com/purchase**.

Chapter 1

Overview

This chapter describes the hardware components of the AT-TQ4600-OF13 Wireless Access Point. It contains the following sections:

Features

The AT-TQ4600-OF13 product consists of the AT-TQ4600 wireless access point with the OpenFlow protocol (version 1.3). The main features of the access point are listed here:

- Dual 2.4 GHz and 5 GHz radio
- IEEE 802.11a/b/g/n/ac
- 3x3:3ss MIMO with internal omni antennas
- Maximum capacity 2.4 GHz: 450 Mbps
- Maximum capacity 5 GHz: 1300 Mbps
- Rogue access point detection
- Multiple SSIDs
- One 10/100/1000Base-T Ethernet port with Auto-Negotiation, auto MDI/MDIX, and IEEE 802.3at Power over Ethernet (PoE+)
- IEEE 802.3 (10Base-T), IEEE 802.3u (100Base-TX), and IEEE 802.3ab (1000Base-T) compliance on the Ethernet port
- Virtual access points for multiple broadcast domains
- DHCP client
- RADIUS accounting with external RADIUS server
- Network Time Protocol (NTP) client
- Domain name server (DNS) client
- IEEE 802.1x authentication
- WPA-Personal and WPA-Enterprise with WPA, WPA2, and CCMP (AES) authentication and encryption
- Static WEP encryption
- HTTP and HTTPS web browser management
- SNMPv1 and v2c management
- Event log
- Syslog client
- Wall or ceiling installation

Secure Enterprise Software Defined Networking Controller

The AT-TQ4600-OF13 wireless access point is a bundled product of the AT-TQ4600 wireless access point and OpenFlow protocol. It is designed to be used with the Secure Enterprise Software Defined Networking (SES) controller. The latter is a management program for Allied Telesis switches and access points. It lets you manage the virtual LAN (VLAN) assignments of hosts, and define where and when hosts can access networks. It can also be used with selected firewalls to automatically implement protective measures, such as blocking or isolating switch ports, when viruses, malware. or other threats are detected.

The SES controller is part of the Software-defined Networking (SDN) solution from Allied Telesis. SDN is a network architecture for controlling network traffic from a central controller instead of managing switches and wireless access points individually. It simplifies network management by removing management tasks and decisions from individual devices, and centralizing them in the controller. This makes it possible for application solutions like the controller to implement network configuration changes from the vantage point of the entire network, rather than from individual devices. Additionally, SDN make it possible to automate network configuration changes that previously had to be handled manually.

Configuration and management instructions from the controller to the switches are transmitted over a network path referred to as the control plane. The control plane for the AT-TQ4600-OF13 wireless access point is based on the OpenFlow protocol, which comes pre-installed and activated on the unit. No subscription license is required.

Topology Example

Figure 1 is an example of a network topology of the SDN solution, consisting of an SES controller, OpenFlow switch, and AT-TQ4600-OF13 wireless access point.
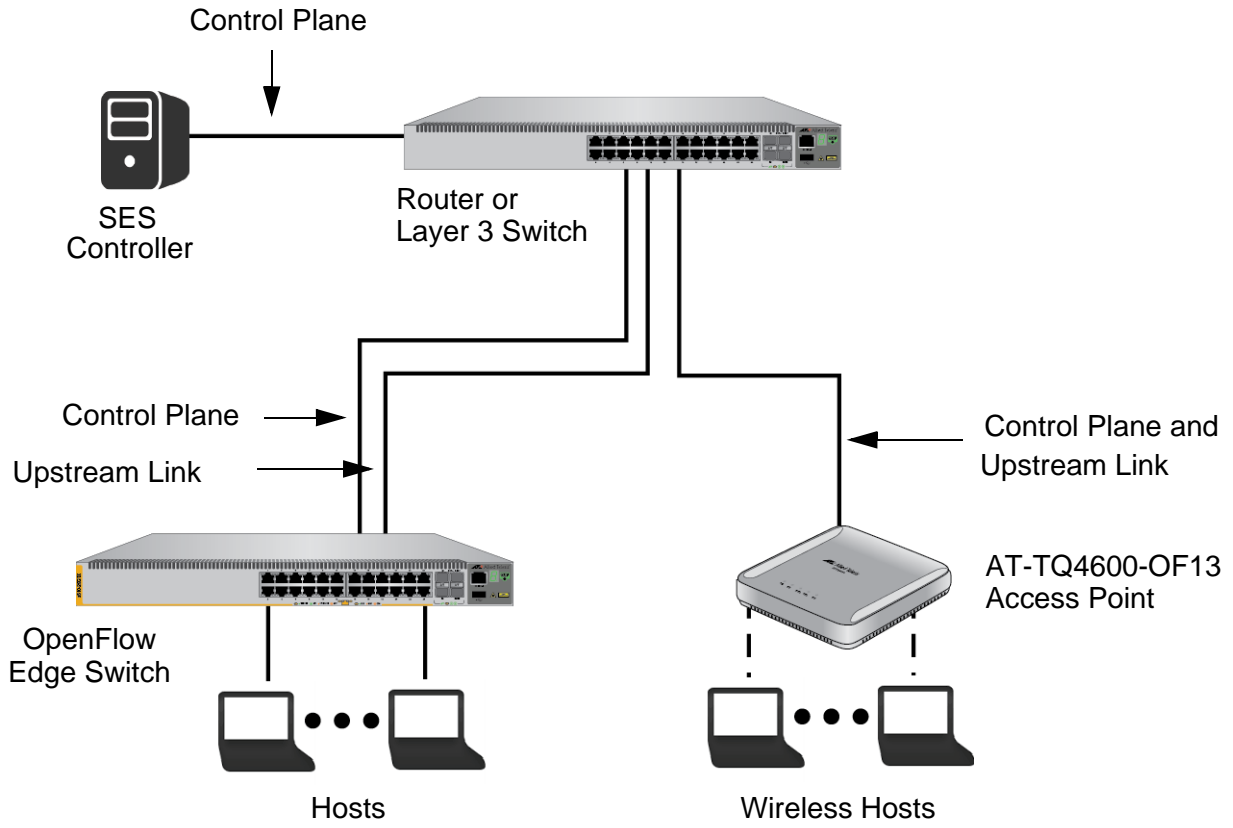
Figure 1. Hardware Topology

The OpenFlow protocol network components are listed in Table 1.

Table 1. OpenFlow Protocol Network Components

Component	Description
SES controller	Server with the controller software. The controller is used to assign network users to virtual LANs and manage when and where they can access a network. For a list of approved servers, refer to the SES Controller and OpenFlow Protocol Installation Guide.

Table 1. OpenFlow Protocol Network Components (Continued)

Component	Description
Control plane	Network pathway over which the SES controller communicates with OpenFlow switches and AT-TQ4600-OF13 access points, using the OpenFlow protocol.
Router or Layer 3 switch	Gateway to the higher level network.
Upstream links	Connections from OpenFlow switches and wireless access points to the higher level network.
OpenFlow edge switches	Allied Telesis switches with the OpenFlow protocol. For a list of approved switches, refer to the SES Controller and OpenFlow Protocol Installation Guide.
AT-TQ4600-OF13	AT-TQ4600 wireless access point with the OpenFlow protocol.
Hosts and wireless hosts	Network edge devices, such as laptop computers or smart phones.

Note

The SES controller is designed for managing edge OpenFlow switches and wireless access points. It should not be used to manage devices in a network core.

Management Tools

You can manage the access point using these three management tools.

❑ Web browser interface - The access point comes with a web browser interface. With the interface you can configure all of the device's features and parameters. The interface consists of menus and windows and is accessed over your network using a web browser at your management workstation. The access point supports both non-secure HTTP and secure HTTPS management sessions. You can manage only one wireless access point at a time with the interface. For instructions on how to start a management session, refer to "Starting the Initial Management Session" on page 48.

❑ SES Controller and OpenFlow protocol - This management program lets you manage the virtual LAN assignments of wireless hosts and define when and where hosts can access your network. As shown in Figure 1 on page 20, the controller resides on a network server and communicates with access points using the OpenFlow protocol, over a network pathway referred to as control plane. To manage wireless hosts, you add network, location, and schedule policies to the controller. Network policies define the VLAN assignments of wireless hosts, location policies define which OpenFlow switches and wireless access point that hosts can use to access your network, and schedule policies control the days and times when hosts can access networks. For more information, refer to the SES Controller and OpenFlow Protocol User Guide.

❑ SNMPv1 and v2c - You can also use SNMP to manage the device. The MIB is available from the Allied Telesis web site. It should be noted that you can use SNMP to configure only a limited number of access point parameters. To manage all the parameters, you must use the web browser interface. For instructions on how to configure the unit for SNMP, refer to the AT-TQ4600-OF13 Wireless Access Point User Guide. The default setting for SNMP is disabled. The product does not support SNMPv3.

Note
The AT-TQ4600-OF13 access point does not support the AT-UWC Series Wireless LAN Controller.

Rear Panel Components

Figure 2 illustrates the rear panel components on the AT-TQ4600-OF13 wireless access point.
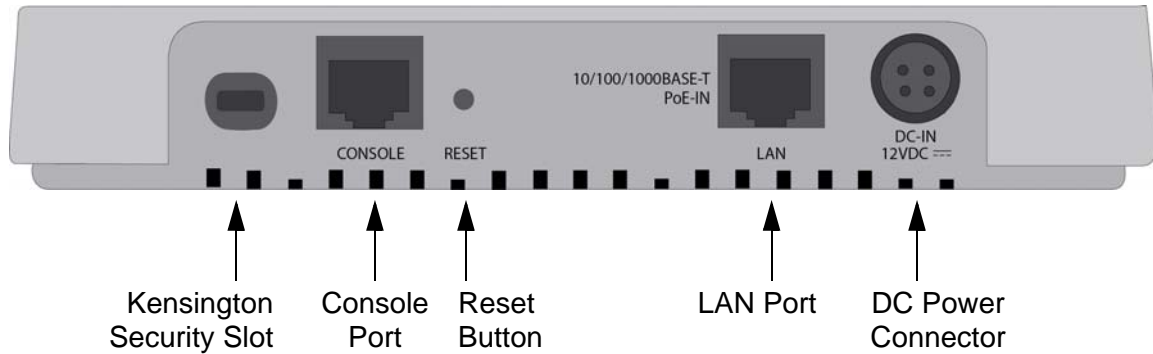
Figure 2. Panel Components

The components are listed in Table 2.

Table 2. Rear Panel Components

Field	Description
Kensington Security Slot	Slot for a Kensington lock to secure the access point.
Console Port	The Console port is for manufacturing purposes only.
Reset Button	The Reset button returns the parameter settings on the access point to their default settings. For information, refer to "Reset Button" on page 28.
LAN Port	The LAN port connects the access point to your wired network. It supports PoE+. Connecting the port to an Ethernet switch that supports PoE+ eliminates the need for the external AT-TQ0091 Power Adapter. For information, refer to "LAN Port" on page 24.
DC Power Connector	This connector is for the external AT-TQ0091 Power Adapter. The access point can be powered with either PoE+ on the LAN port or the power adapter. The AT-TQ0091 Power Adapter must be ordered separately from Allied Telesis.

LAN Port

The LAN port functions as the control plane port and upstream link for the wireless access point. As the control plane port, it provides the pathway from the unit to the SES controller. As also the upstream link, it connects the device and wireless hosts to the higher level network.

> **Note**
> The port must be connected to a non-OpenFlow device. Do not cascade OpenFlow devices.

Power over Ethernet

The AT-TQ4600-OF13 Access Point supports Power over Ethernet (PoE+) on the LAN port. The unit is a PoE+ class 4 powered device with a maximum power consumption of 16 watts. When the port is connected to a PoE+ Ethernet switch, the unit receives its power over the network cable that carries the network traffic. If you use the PoE+ feature, you do not need to order the AT-TQ0091 Power Adapter.

Connector Type

The LAN port has an eight-pin RJ45 connector. The port uses four pins at 10 or 100 Mbps and all eight pins at 1000 Mbps. The pin assignments are listed in "LAN Port" on page 61.

Speed

The port can operate at 10, 100, or 1000 Mbps. The speed is set automatically with Auto-Negotiation. You cannot disable Auto-Negotiation on the port.

> **Note**
> The port should be connected to a network device that also uses Auto-Negotiation. If the network device does not support Auto-Negotiation, the LAN port operates at 10 Mbps, which may reduce network performance.

Duplex Mode

The port can operate in either half- or full-duplex mode at 10 or 100 Mbps, and full-duplex mode at 1000 Mbps. It is IEEE 802.3u-compliant and uses Auto-Negotiation to set the duplex mode. (You cannot disable Auto-Negotiation on the port.)

Note
The LAN port should be connected to a network device that also
sets its duplex mode with Auto-Negotiation. If the other device does
not support Auto-Negotiation, the port operates at half-duplex mode,
possibly resulting in a duplex mode mismatch if the other device is
operating at full duplex.

**Maximum
Distance**

The LAN port has a maximum operating distance of 100 meters (328 feet).

**Cable
Requirements**

The cable requirements for the port are listed in Table 3 on page 25.

Table 3.   Twisted Pair Cable for the LAN Port

Cable Type	10Mbps		100Mbps		1000Mbps	
	Non-PoE+	PoE+	Non-PoE+	PoE+	Non-PoE+	PoE+
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and 16 MHz frequency.	Yes	No	No	No	No	No
Standard TIA/EIA 568-A-compliant Category 5 shielded or unshielded cabling with 100 ohm impedance and 100 MHz frequency.	Yes	Yes	Yes	Yes	No	No
Standard TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and 100 MHz frequency.	Yes	Yes	Yes	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes	Yes	Yes	Yes

**Automatic MDIX
Detection**

The LAN port is IEEE 802.3ab compliant and features automatic MDIX
detection when operating at 10 or 100 Mbps. (Automatic MDIX detection
does not apply to 1000 Mbps.) This feature automatically configures the
port to MDI or MDI-X depending on the wiring configuration of the port on

the Ethernet switch.

You cannot disable automatic MDIX detection. For automatic MDIX detection to work properly, it must also be present on the Ethernet switch. The port defaults to MDIX if it is connected to a network device that does not support automatic MDIX detection.

Port Pinouts   Refer to Table 11 on page 61 for the port pinouts of the LAN port when it is operating at 10 or 100 Mbps in the MDI configuration and Table 12 on page 61 for the MDI-X configuration. Refer to Table 13 on page 62 for the port pinouts when the port is operating at 1000 Mbps.

LEDs

The LEDs on the AT-TQ4600-OF13 Access Point are described in Table 4.

Table 4.   LEDs on the AT-TQ4600-OF13 Access Point

LED	State	Description
PWR	Solid Green	The unit is receiving DC power that is within the normal operating range.
	Off	The power supply is not receiving power from either the AC/DC power adapter or a PoE+ Ethernet switch.
SYS	Solid Amber	The access point is loading its firmware or there is a system fault.
	Off	The unit is operating normally.
LAN	Solid Green	The Ethernet port is operating at 1000 Mbps.
	Flashing Green	The Ethernet port is operating at 1000 Mbps with link activity.
	Solid Amber	The Ethernet port is operating at 10/100 Mbps.
	Flashing Amber	The Ethernet port is operating at 10/100 Mbps with link activity.
2.4GHz	Solid Green	The 2.4GHz radio is sending and receiving radio waves.
5GHz	Solid Green	The 5GHz radio is sending and receiving radio waves.

Note
You can turn off the LEDs with the management software.

Reset Button

The Reset button on the rear panel is used to return the parameter settings of the unit to their default values. You might use the button if you want to discard the current configuration of the device or because you forgot the password to the manager account and cannot manage the unit.

You can disable the button using the management software. If the unit is installed in a non-secure area, you might want to disable the button to prevent unauthorized individuals from pressing it and disrupting the operations of your wireless network.

The Reset button is recessed to prevent it from being accidentally pressed. To press the button, use a pointed object, such as the end of a straightened paper clip. Hold the button for five seconds and release. The access point resets and loads its default configuration in a process that takes one minute to complete.

After returned to its default configuration, the wireless access point uses its DHCP client to query your network for a DHCP server, for an IP address. If your network does not have a DHCP server, the unit automatically uses the default address 192.168.1.230 and subnet mask 255.255.255.0. For instructions on how to start a management session when the access point is at its default configuration, refer to "Starting the Initial Management Session" on page 48.

Planning a Wireless Network

Instructions on how to plan a wireless network are beyond the scope of this guide. But here are several basic factors to consider:

❑ Number of access points: You need to determine the number of access points required to provide wireless coverage to the entire site and to handle the number of wireless hosts.

❑ Number of wireless networks: Determining the number of wireless networks has a variety of variables, including the number of companies or organizations occupying a site and whether networks require different types of authentication.

❑ Network operating specifications: You have to decide on the operating specifications of the networks, including 802.11 modes and radio channels.

❑ Authentication: You have to determine whether authentication for the wireless clients is required and, if so, which type.

❑ Hotspots: You have to decide whether to include hotspots to allow wireless clients access to the Internet through your networks.

❑ Access days and times: The SES controller lets you add schedule policies that control the days and times when hosts can access networks.

Unsupported Features

The following features in the AT-TQ4600-OF13 wireless access point should not be used with the OpenFlow protocol:

❑ Wireless Distribution System (WDS) bridges

❑ Access point clustering

❑ MAC address filtering

❑ Broadcast and multicast rate limiting

❑ TKIP cipher suite in WPA-Personal or WPA-Enterprise with WPA or WPA2

❑ Quality of Service

❑ Link Layer Discovery Protocol

Chapter 2

Installing the Access Point

This chapter describes how to install the AT-TQ4600-OF13 wireless access point. This chapter contains the following sections:

❒ "Reviewing Safety Precautions" on page 32

❒ "Unpacking the AT-TQ4600-OF13 Access Point" on page 35

❒ "Installing the Access Point on a Wall or Ceiling" on page 37

❒ "Cabling the Access Point" on page 43

❒ "Connecting the AT-TQ0091 AC/DC Power Adapter" on page 44

❒ "Securing the Access Point" on page 46

Reviewing Safety Precautions

Please review the following safety precautions before you begin installing the access point.

Note
The ☞ indicates that a translation of the safety statement is available in a PDF document titled *Translated Safety Statements* on the Allied Telesis website at **www.alliedtelesis.com/support**.

Warning
To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables. ☞ E1

Warning
Do not work on equipment or cables during periods of lightning activity. ☞ E2

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. ☞ E3

Note
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. ☞ E5

Caution
Air vents must not be blocked and must have free access to the room ambient air for cooling. ☞ E6

Warning
Operating Temperature. This product is designed for a maximum ambient temperature of 40°C ↩ E7.

Warning
To reduce the risk of electric shock, the PoE port on this product must not connect to cabling that is routed outside the building where this device is located. ↩ E40

Caution
FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. ↩ E80

Warning
This equipment is intended for indoor use only. ↩ E95

Note
All Countries: Install product in accordance with local and National Electrical Codes. ↩ E8

Note
This product is not approved for use in a computer room as defined in the Standard for Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.

Note
If you are not using PoE to power to unit, use only an approved AC/DC adapter.

Note
You should verify that your PoE network adheres to the standards of a separated extra-low voltage (SELV) circuit before using the PoE feature on the wireless access point.

Note
Suitable for use in environmental air space in accordance with
Section 300.22.C of the National Electrical Code, and Sections 2-
128, 12-010(3) and 12-100 of the Canadian Electrical Code, Part 1,
C22.1. Refer to "Installation Requirements per UL 2043
Compliance" for installation requirements.

Installation Requirements per UL 2043 Compliance

To comply with the UL 2043 safety requirement when installing the unit in
a plenum, you must install it in horizontal orientation. See Figure 3.

Correct Orientations
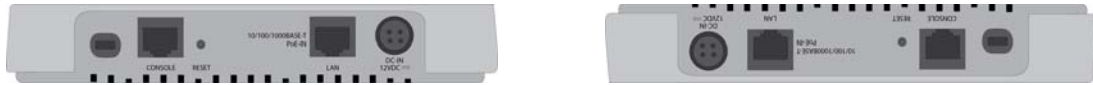
Incorrect Orientations
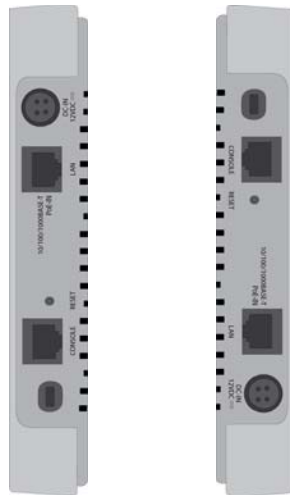
Figure 3. Unit Orientation in a Plenum for UL 2043

Unpacking the AT-TQ4600-OF13 Access Point

The shipping container should include the items in Figure 4.

One AT-TQ4600 Wireless Access Point
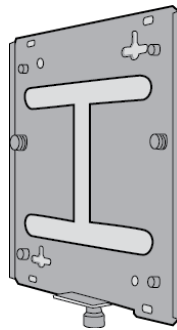
One wall-mounting base plate

One wall-mounting bracket

One M3 0.5 bracket screw

Figure 4. Contents of the Shipping Box

If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.

If you are not using the PoE feature on the LAN port to power the access point, you must separately order the AT-TQ0091 AC/DC Power Adapter. The adapter comes with four regional AC plugs. (The adapter comes with one AC plug pre-installed.) There are two versions of the power adapter. Refer to Figure 5 on page 36.
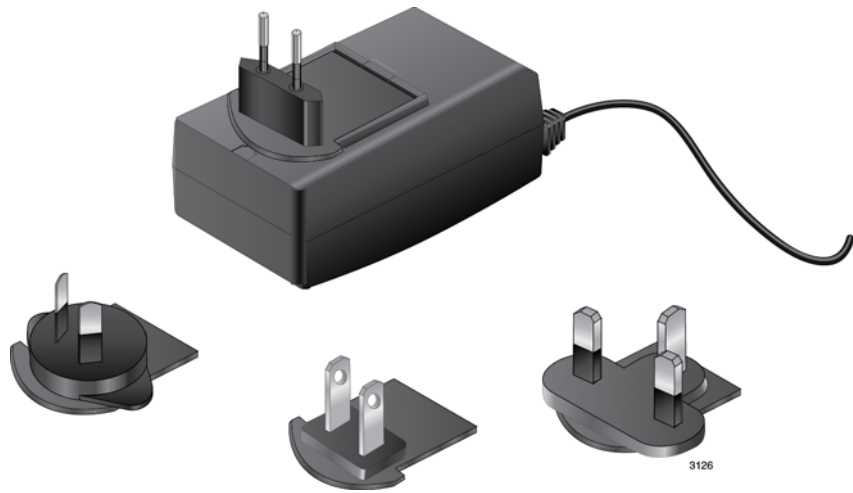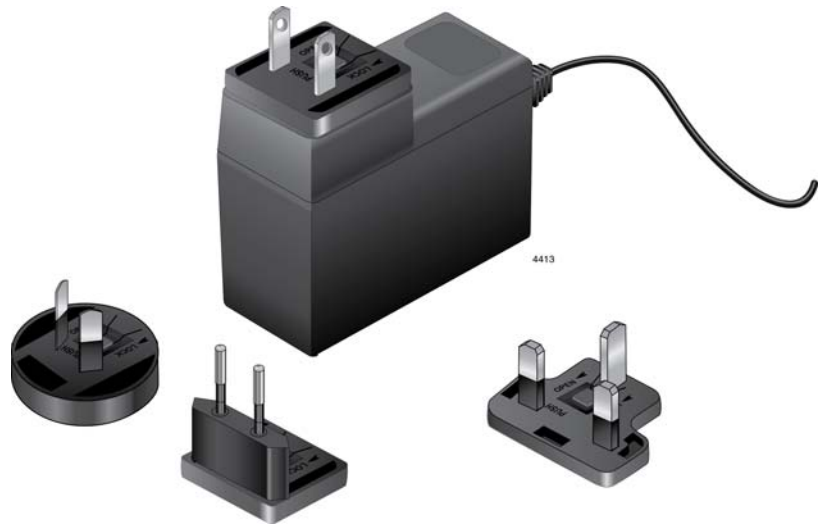
Figure 5. AT-TQ0091 AC/DC Power Adapters

Installing the Access Point on a Wall or Ceiling

This procedure contains the following sections.

❒ "Guidelines"

❒ "Mounting the Base Plate to the Wall or Ceiling" on page 38

❒ "Attaching the Mounting Bracket to the Access Point" on page 39

❒ "Attaching the Access Point to the Base Plate" on page 41

❒ "Cabling the Access Point" on page 43

Guidelines   Please review the following guidelines before installing the access point on a wall or ceiling:

❒ The selected location must not block the ventilation slots around the base of the unit. Refer to Figure 6.

Ventilation Slots

Figure 6. Ventilation Slots

❒ The wall or ceiling mounting surface must be of proper material to accommodate the self-tapping screws, such as wood strong enough to support the weight of the equipment and cables. Otherwise, you must provide anchors to fit the mounting surface.

❒ One mounting-bracket screw is provided for attaching the mounting bracket to the unit. You must provide the four self-tapping screws that secure the base plate to the wall or ceiling.

❒ The location must have an AC power source if you are using the AT-TQ0091 Power Adapter.

Mounting the Base Plate to the Wall or Ceiling

To mount the base plate to the wall or ceiling, perform the following:

1. Position the base plate at the desired location on the wall or ceiling for the access point and mark the four screw holes. Refer to Figure 7.
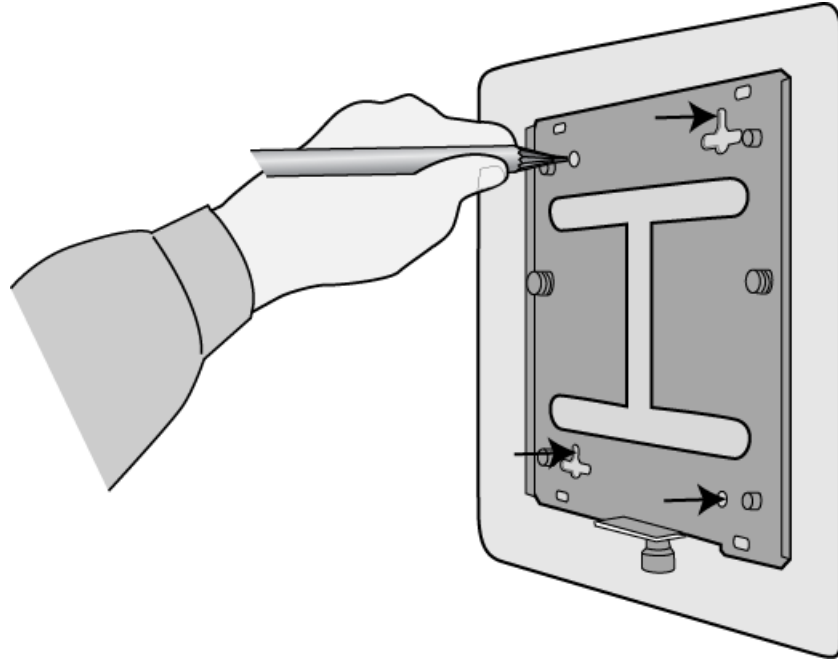
Figure 7. Marking the Four Screw Holes in the Base Plate

See Figure 8 for hole dimensions.
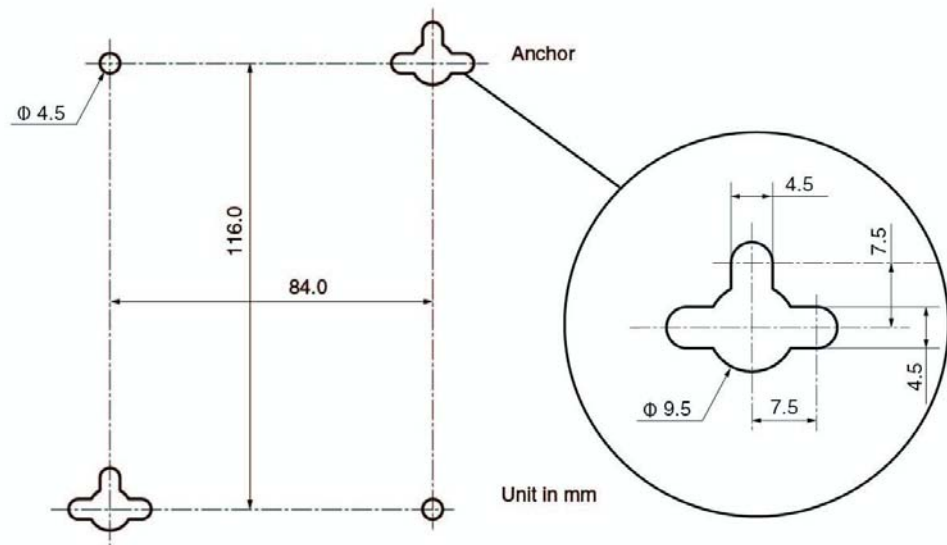
Figure 8. Base Plate Hole Dimensions

2. Drill the holes for the four self-tapping screws, and if applicable, two wall anchors.

3. Install wall anchors, if required.

4. Attach the base plate to the wall or ceiling using self-tapping screws. Refer to Figure 9.
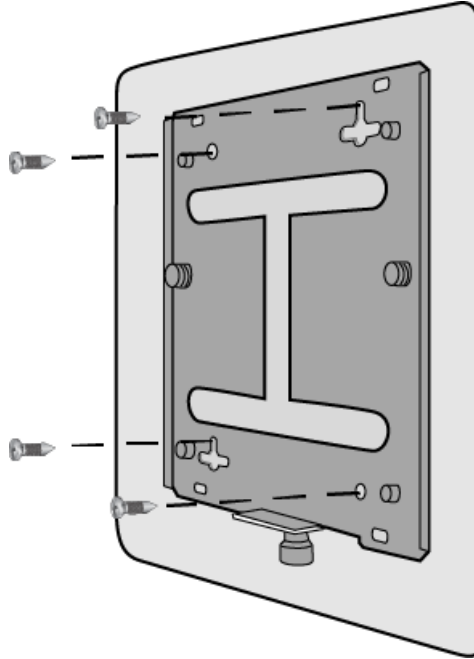
Figure 9. Mounting the Base Plate to the Wall

Attaching the Mounting Bracket to the Access Point

To attach the mounting bracket to the access point, perform the following:

1. Place the access point upside down on a flat surface.

2. Place the bracket against the bottom of the access point and use the bracket to push downward on the stopper nub. See Figure 10 on page 40).

Screw Hole   Hooks   Stopper Nub
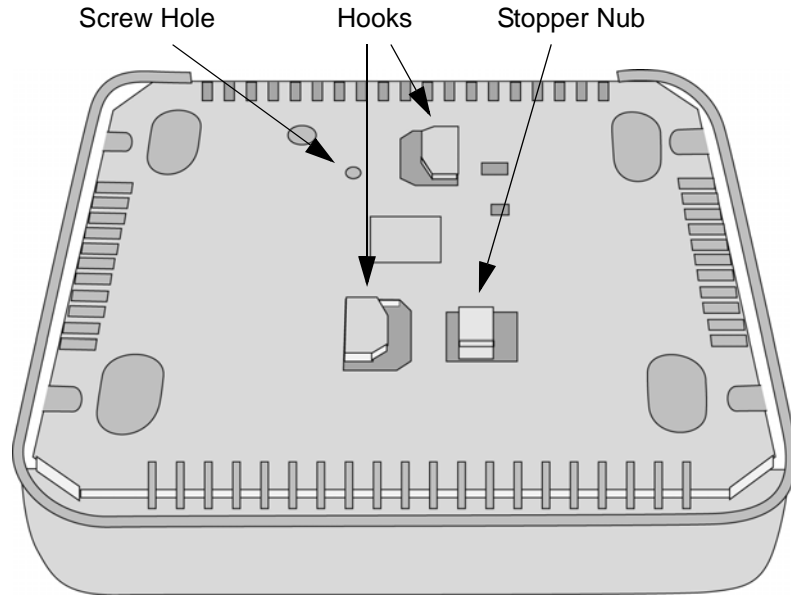
Figure 10. Bottom of Access Point

3. Turn the bracket in the direction of the arrows shown in Figure 11 until
    the two hooks hold the bracket: The stopper nub pops up, and the
    bracket locks in place.

Notch   Hooks
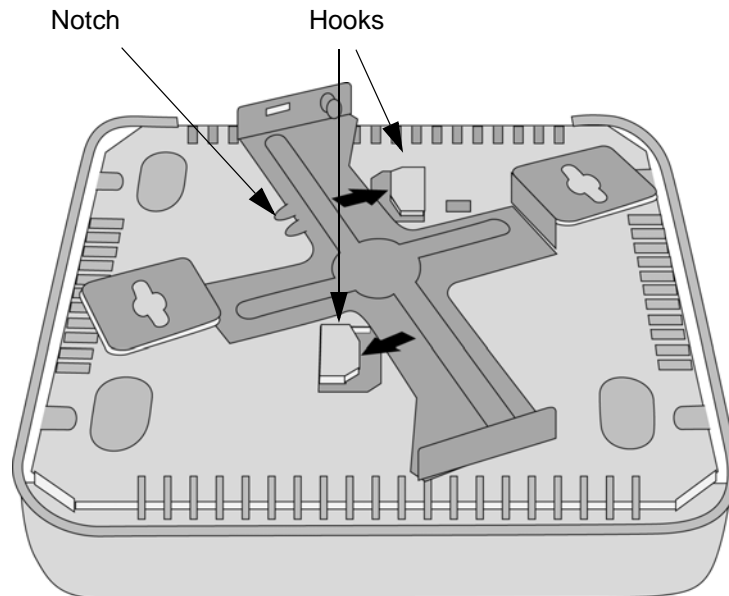
Figure 11. Locking Bracket to Access Point

4. Attach the mounting-bracket screw through the notch in the mounting
    bracket to the access point, as shown in Figure 12 on page 41.

Screw   Stopper Nub Up
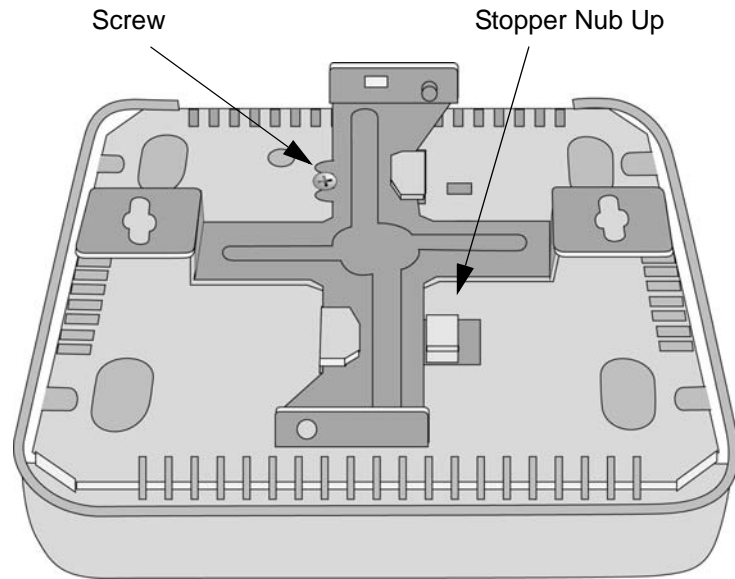
Figure 12. Securing the Mounting-Bracket

Attaching the Access Point to the Base Plate

To attach the access point and mounting bracket to the base plate on the wall or ceiling, perform the following:

1. Have someone hold the bottom of the access point next to the base plate attached to the wall or ceiling.

2. Insert the two pins on the base plate into the keyhole slots on the mounting bracket. Refer to Figure 13 on page 42.

Key Holes   Keys

Captive Screw

Keyhole Slot   Head   Neck

Insert   Pin   Slide   Locked
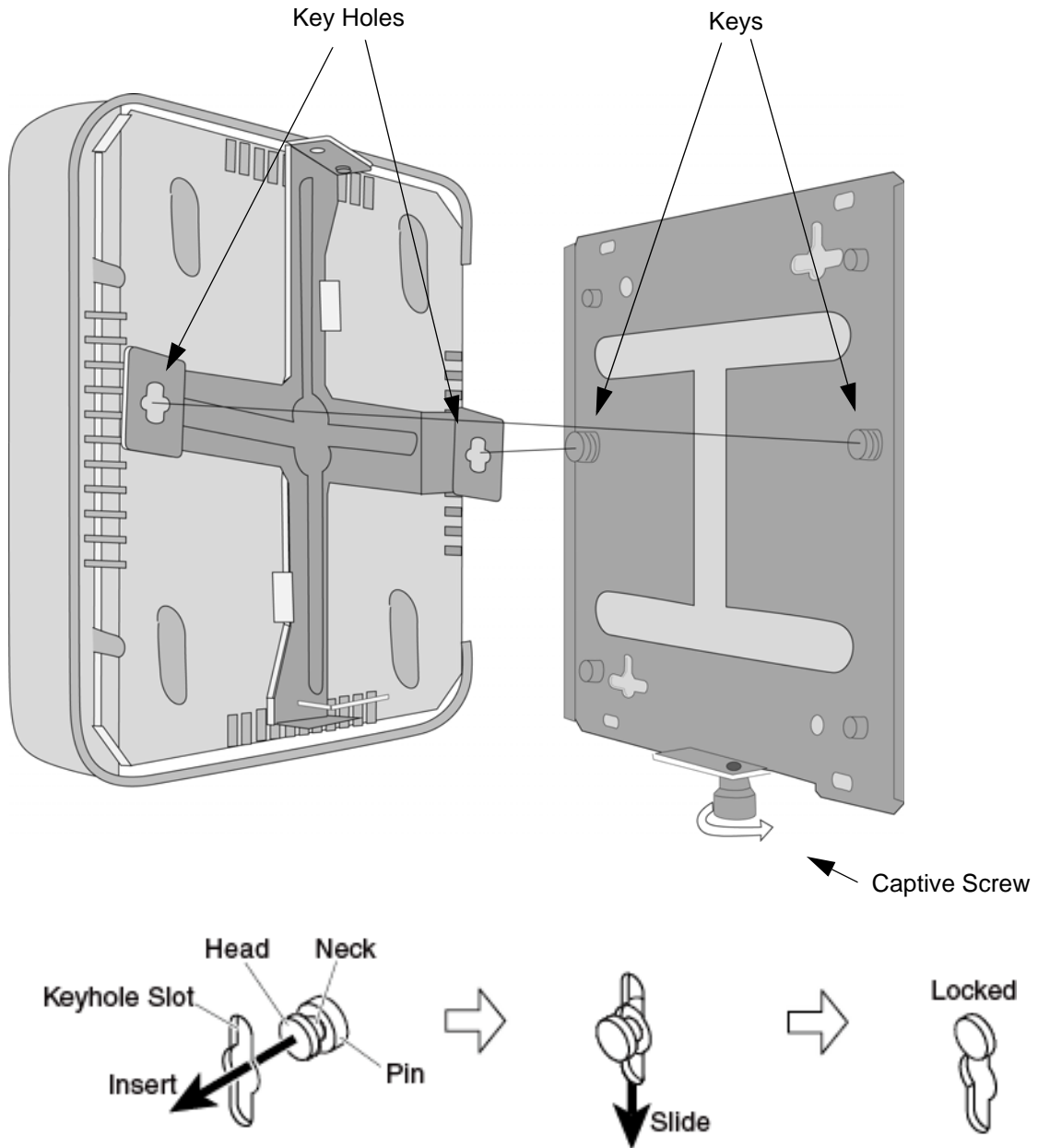
Figure 13. Attaching the Access Point to the Base Plate

3. Slide the access point downward to lock the necks of the pins on the base plate in the slots on the mounting bracket. Refer to Figure 13.

4. Fasten the access point to the base plate by turning the base-plate captive screw clockwise using a Phillips-head screwdriver. Refer to Figure 12.

Cabling the Access Point

To cable the access point, perform the following procedure:

1. Connect a network cable to the LAN port on the rear panel of the access point. Refer to Figure 14. The specifications of the cable are listed in Table 3 on page 25.

Figure 14. Connecting a Network Cable to the LAN Port

2. If you have not already done so, connect the other end of the network cable to a port on an Ethernet switch.

   Note
   The Ethernet switch cannot be an OpenFlow device. You cannot cascade OpenFlow devices.

3. Do one of the following:

   ❑ If the LAN port on the access point is connected to a PoE source, the installation procedure is complete. If the unit is receiving power from the PoE source, it initializes its firmware, a process that takes about one minute. Go to "Securing the Access Point" on page 46 or "Starting the Initial Management Session" on page 48.

   ❑ To power the access point with the AT-TQ0091 AC/DC Power Adapter, go to "Connecting the AT-TQ0091 AC/DC Power Adapter" on page 44.

Connecting the AT-TQ0091 AC/DC Power Adapter

To power the access point with the AT-TQ0091 AC/DC Power Adapter, perform the following procedure:

1. Connect the DC power cable from the AT-TQ0091 AC/DC Power Adapter to the DC 12V connector on the rear panel of the access point. Refer to Figure 15.

Figure 15. Connecting the Power Cable from the AT-TQ0091 AC/DC Adapter

2. Verify that the AC plug on the AC/DC Power Adapter is the correct plug for your region. If it is not the correct plug, remove it by pushing down on the release tab and sliding it from the slot on the adapter. Refer to Figure 16 on page 45.

Release Tab

Release Tab
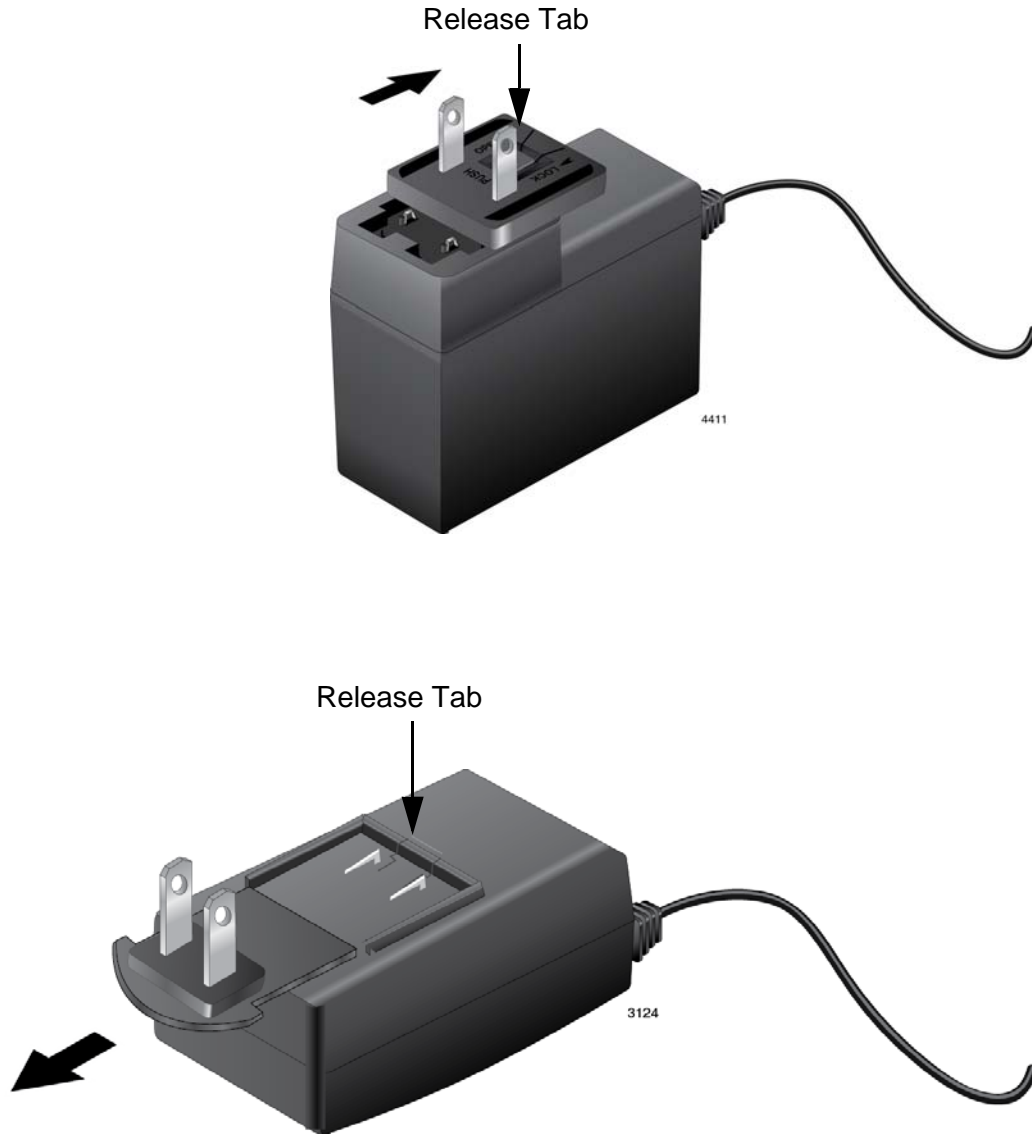
Figure 16. Removing an AC Plug from the AT-TQ0091 AC/DC Power Adapter

3. Slide the correct AC plug for your region into the slot on the adapter until it clicks into place.

4. Connect the AC plug on the power cord to an appropriate AC power source. Refer to Table 9 on page 60 for the power specifications of the power adapter.

   The unit starts to initialize its firmware, a process that takes about one minute. Go to "Securing the Access Point" on page 46 or "Starting the Initial Management Session" on page 48.

Securing the Access Point

The access point has a Kensington security slot for a lock to secure the device. Refer to Figure 2 on page 230. You should install a lock if the access point is installed in a non-secure location. For installation directions, refer to the manufacturer's instructions. Anti-theft devices are not available from Allied Telesis.

Chapter 3
Performing the Initial Configuration

This chapter explains how to start the initial management session on the AT-TQ4600-OF13 wireless access point and configure the unit for the SES controller and optional AT-UWC management program. This chapter contains the following sections:

❑   "Starting the Initial Management Session" on page 48

❑   "Setting the Country Code" on page 52

❑   "Configuring the Access Point for the SES Controller" on page 54

Note
The non-US model of this product has a country code setting that must be set during the initial management session of the unit. The setting ensures that the unit operates in compliance with the laws and regulations of your country or region.

For the US model, the country code is preset and cannot be changed. Per FCC regulations, the country code setting for all WiFi products marketed in the US must be fixed to US operational channels only.

Starting the Initial Management Session

There are a several ways to start your initial management session on the access point. If your network has a DHCP server, you can connect the LAN port on the access point to your network and let the DHCP server automatically assign an IP address to the device. You can then use that address to start your management session.

If your network does not have a DHCP server, or if you want to pre-configure the device before connecting it to your network, you can establish a direct connection between your computer and the access point. This involves connecting an Ethernet cable to the Ethernet port on your computer and the LAN port on the access point. This procedure requires changing the IP address on the computer to make it a member of the same subnet as the default IP address on the access point, which is 192.168.1.230/24.

You can still connect the access point to your network for the initial management session even if you do not have a DHCP server. However, you still have to change the IP address of your computer to match the subnet of the default address of the access point. Furthermore, if your network is divided into virtual LANs (VLANs), you have to be sure to connect the access point and your computer to ports on an Ethernet switch that are members of the same VLAN.

The instructions for starting the initial management session are found in the following sections:

❒ "Starting the Initial Management Session with a DHCP Server" on page 48

❒ "Starting the Initial Management Session with a Direct Connection" on page 49

❒ "Starting the Initial Management Session without a DHCP Server" on page 50

> **Note**
> The initial management session of the access point has to be conducted through the LAN port because the default setting for the radios is off.

Starting the Initial Management Session with a DHCP Server

This procedure explains how to start the initial management session on the access point when the LAN port is connected to your network. This procedure assumes that your network has a DHCP server and that you configured the DHCP server to assign the access point the necessary configuration information (for example, IP address and default gateway). To start the management session, perform the following procedure:

1. If the LAN port is not connected to a network device, such an Ethernet switch or a router, connect it now.

2. Do one of the following:

   ❒ If the unit is powered with PoE, go to the next step.

   ❒ To power the unit with the AT-TQ0091 AC/DC power adapter, go to "Connecting the AT-TQ0091 AC/DC Power Adapter" on page 44.

3. Wait one minute for the unit to initialize its firmware.

4. Start the web browser on your computer.

5. Enter the IP address of the access point in the URL field of the browser. This is the IP address assigned to the unit by the DHCP server. If you do not know the address, refer to the DHCP server.

   You should now see the logon window in Figure 17.

Figure 17. Logon Window

6. Enter "manager" for the username and "friend" for the password. The username and password are case-sensitive.

7. Go to "Setting the Country Code" on page 52.

Starting the Initial Management Session with a Direct Connection

To start the management session with a direct Ethernet connection between your computer and the access point, perform the following procedure:

> **Note**
> This procedure requires removing the network cable from the LAN port. Consequently, you cannot use this procedure if the unit is using PoE for power, and you did not order the AT-TQ0091 AC/DC adapter. Instead, perform "Starting the Initial Management Session with a DHCP Server" on page 48 or "Starting the Initial Management Session without a DHCP Server" on page 50.

1. Connect one end of a network cable to the LAN port on the access point and the other end to the Ethernet network port on your computer. (This requires removing the network cable that you connected to the LAN port earlier in these instructions.)

2. Connect the AT-TQ0091 AC/DC power adapter to power on the access point. For instructions, refer to "Connecting the AT-TQ0091 AC/DC Power Adapter" on page 44.

3. Wait one minute for the unit to initialize its firmware.

4. Change the IP address on your computer to 192.168.1.*n*, where *n* is any number from 1 to 254, except 230. Refer to its documentation for instructions on how to set the IP address.

5. Set the subnet mask on your computer to 255.255.255.0.

6. Start the web browser on your computer.

7. Enter the IP address 192.168.1.230 in the URL field of the browser.

   You should now see the logon window, shown in Figure 17 on page 49.

8. Enter "manager" for the username and "friend" for the password. The username and password are case-sensitive.

9. Go to "Setting the Country Code" on page 52.

Starting the Initial Management Session without a DHCP Server

This procedure explains how to start the initial management session on the access point when the LAN port is connected to an Ethernet switch on a network that does not have a DHCP server. To start the management session, perform the following procedure:

1. If your network has VLANs, verify that your computer and the access point are connected to ports on the Ethernet switch that are members of the same VLAN. This might require accessing the firmware on the switch and listing the VLANs and their port assignments. If your network is small and does not have VLANs or routers, you can connect your computer to any port on the Ethernet switch.

2. Change the IP address on your computer to 192.168.1.*n*, where *n* is any number from 1 to 254, except 230. Refer to the documentation that accompanies your computer for instructions on how to set the IP address.

3. Set the subnet mask on your computer to 255.255.255.0.

4. Do one of the following:

   ❏ If the access point is powered with PoE, go to the next step.

   ❏ To power the unit with the AT-TQ0091 AC/DC power adapter, go to "Connecting the AT-TQ0091 AC/DC Power Adapter" on page 44.

5. Start the web browser on your computer.

6. Enter the IP address 192.168.1.230 in the URL field of the browser.

   You should now see the logon window, shown in Figure 17 on page 49.

7. Enter "manager" for the username and "friend" for the password. The username and password are case-sensitive.

8. Go to "Setting the Country Code" on page 52.

Setting the Country Code

You should set the country code during the initial management session of the access point to ensure that the device operates in compliance with the codes and regulations of your region or country.

> **Note**
> The non-US model of this product has a country code setting that must be set during the initial management session of the unit. The setting ensures that the unit operates in compliance with the laws and regulations of your country or region.
>
> For the US model, the country code is preset and cannot be changed. Per FCC regulations, the country code setting for all WiFi products marketed in the US must be fixed to US operational channels only.

To set the country code, perform the following procedure:

1. Select **Manage** -> **Wireless Settings**.

    The access point displays the Modify wireless settings window, shown in Figure 18.

Figure 18. Modify Wireless Settings Window

2. Select the Country pull-down menu and select your country or region.

> **Note**
> If the Country pull-down menu is deactivated and cannot be changed, the country parameter was set when the unit was manufactured. If the setting is not correct for your country or region, contact your Allied Telesis sales representative for assistance.

The access point displays a confirmation prompt.

3. Click OK to change the country setting or Cancel to cancel the procedure.

If you click OK, the access point changes the country setting and disables both radios on the access point.

This procedure does not require clicking the Update button.

You must now reboot the access point. The new country setting is not active until the unit is rebooted. To reboot the unit, either power off and on the unit or continue with these steps:

4. Select **Maintenance** -> **Configuration**.

5. Click the **Reboot** button in the To Reboot the Access Point section of the "Manage the Access Point's Configuration" window.

6. When the access point displays a confirmation prompt, click **OK** to reboot the unit or Cancel to cancel the procedure.

7. To resume managing the unit, wait for it to complete initializing its management software and then start a new management session.

8. Go to "Configuring the Access Point for the SES Controller" on page 54 or AT-TQ4600-OF13 Wireless Access Point User Guide for additional management instructions.

Configuring the Access Point for the SES Controller

This procedure explains how to configure the wireless access point for the SES controller. This involves designating the IP address of the SES controller and providing other information. The wireless access point immediately begins to communicate with the SES controller after you enter the IP address, In response, the SES controller adds the wireless access point to its database. Once that happens, you can add network, location, and schedule policies to the SES controller to define the VLAN assignments of wireless hosts, and the locations and times when they can use the access points to access your network. For more information, refer to the SES Controller and OpenFlow Protocol User Guide.

You can enter the IP addresses of up to three SES controllers, but the wireless access point can communicate with only one controller at a time. If it cannot communicate with a controller, it tries the next controller in the list. If it cannot communicate with any of the controllers, it activates its critical mode, explained in Table 5 on page 55.

To configure the wireless access point for the SES controller, perform the following procedure:

1. Select **Manage** -> **OpenFlow**.

   The access point displays the OpenFlow Configuration and Settings window, shown in Figure 19 on page 54.

Figure 19. OpenFlow Configuration and Settings Window

2. Configure the settings in the window. Refer to Table 5.

Table 5. OpenFlow Configuration and Settings Window

Parameter	Description
Datapath ID	Enter a unique identifier of 16 hexadecimal digits for the wireless access point. The controller identifies the device by this number. Each OpenFlow switch and access point must have a unique datapath ID. The default is the device's MAC address preceded by four zeros (0000). For example, an access point with the MAC address 00:1A:E6:39:65:44 would have the default datapath ID 0000001AE6396544. To view the MAC address of the unit, select Basic Settings from the main menus. Changing the datapath ID of the access point after it has established communications with the SES controller may result in two entries for the device in the controller. One datapath ID will be the new value and the other will be the previous value, which will be obsolete. For this reason it is recommended that if you change this value, you should set it before the access point begins communicating with the controller. This field does not display the default value. The wireless access point uses its default value when the field is empty.
Critical Mode	Select a critical mode option. This controls how the wireless access point responds if it loses communications with the SES controller. You can select only one critical mode: The options are listed here:

Table 5. OpenFlow Configuration and Settings Window (Continued)

Parameter	Description
Critical Mode (continued)	- Disabled: The wireless access point continues forwarding traffic from known hosts using the OpenFlow flow rules it has already learned from the controller. It blocks all traffic from unknown hosts. Traffic from known hosts become blocked if their flow rules expire before communications with the controller are restored. Once communications with the controller are restored, the access point resumes learning flow rules and forwarding traffic from unknown hosts or hosts whose flow rules have expired. This is the default setting.
	- Enabled (Accept All): The access point deletes all OpenFlow flow rules and functions as a non-OpenFlow access point, forwarding packets based on the VIDs of the virtual access points (VAPs). Once communications with the controller are restored, the access point begins relearning the flow rules as it receives packets from the wireless hosts, and resumes forwarding packets based on the flow rules.
	- Enabled (Drop All): The access point deletes all flow rules and blocks all traffic from known and unknown wireless hosts until it reestablishes communications with the controller, after which it begins relearning the flow rules.
Critical mode fallback time	Enter the amount of time in seconds that the access point tries to reestablish communications to the controller before activating the critical mode. The default is 15 seconds.
Controller IP Address / Port	Enter the IP address and protocol port number of the SES controller. You can enter up to three addresses.
TLS	Reserved for future development. Leave the check box empty.
Radius Disconnect Settings	Reserved for future development. Do not change the settings for these options.

3. Click **Update**.

   At this point, the wireless access point attempts to establish communications with the SES controller on the control plane and does one of the following:

❏ If it can communicate with the controller, it begins forwarding traffic from wireless hosts to the controller to learn their network, location, or schedule policies. After learning the flow rules for the hosts from the controller, it begins forwarding their traffic.

❏ If it cannot establish communications with the controller, it refers to its critical mode setting to determine whether to forward traffic. Refer to Table 5 on page 55.

For more information, refer to the SES Controller and OpenFlow Protocol User Guide.

Appendix A
Technical Specifications

This appendix contains the following sections:

❐ "Physical Specifications"

❐ "Environmental Specifications"

❐ "Power Specifications" on page 60

❐ "LAN Port" on page 61

❐ "Safety and Electromagnetic Emissions Certifications" on page 63

Physical Specifications

Table 6.   AT-TQ4600 Physical Specifications

Dimensions (W x D x H)	170.0 mm x 170.0 mm x 35.0 mm (6.7 in. x 6.7 in. x 1.4 in.)
Weight	0.47 kg (1 lb.)

Environmental Specifications

Table 7.   Environmental Specifications

Operating Temperature of the Access Point When Using PoE	0° C to 40° C (32° F to 104° F)
Operating Temperature of the Access Point When Using the AC/ DC Adapter	0° C to 40° C (32° F to 104° F)
Storage Temperature	-20° C to 60° C (-4° F to 140° F)
Operating Humidity	5% to 80% non-condensing
Storage Humidity	5% to 95% non-condensing

Power Specifications

Table 8.   AT-TQ4600-OF13 Maximum Power Consumption

AT-TQ4600	16 watts

Table 9.   AT-TQ0091$^{(A124\text{-}11202050)}$ Power Adapter

Input Range	100~240 VAC
Input Frequency	50 - 60 Hz
Input Current	0.6 A
Output Voltage	+12 VDC
Output Current	2A max.

LAN Port

Table 10. LAN Port Specifications

Connector	RJ45
Standards	IEEE 802.3 (10Base-T) IEEE 802.3u (100Base-TX) IEEE 802.3ab (1000Base-T)
PoE standard	IEEE 802.3at (class 4)

Figure 20 illustrates the pin layout of the LAN port.
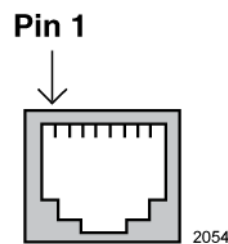
Figure 20. Pin Layout for the RJ45 Connector on the LAN Port

Table 11 lists the pin signals when the port is operating in the MDI configuration at 10 or 100 Mbps.

Table 11. MDI Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 12 lists the pin signals for the MDI-X configuration at 10 or 100 Mbps.

Table 12. MDI-X Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	RX+
2	RX-
3	TX+

Table 12.   MDI-X Pin Signals (10Base-T or 100Base-TX) (Continued)

Pin	Signal
6	TX-

Table 13 lists the pin signals when the LAN port is operating at 1000 Mbps.

Table 13. 1000Base-T Connector Pinouts

Pin	Pair	Signal
1	1	TX and RX
2	1	TX and RX-
3	2	TX and RX+
4	3	TX and RX+
5	3	TX and RX-
6	2	TX and RX-
7	4	TX and RX+
8	4	TX and RX-

Safety and Electromagnetic Emissions Certifications

Table 14.   Safety and Electromagnetic Emissions Certificates

Standard Compliance	RoHS compliant European Union RoHS (Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.)
Certificates	CE EAC FCC/IC KC RCM Wi-Fi CERTIFIED
Electromagnetic Compatibility (EMC)	EN 301 489-1 EN 301 489-17 EN 55024 EN 55032 EN 61000-3-2 EN 61000-3-3 EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-8 EN 61000-4-11 AS/NZS CISPR 32 FCC 47 CFR Part 15, Subpart B ICES-003
Medical (EMC)	EN 60601-1-2
Radio Equipment	EN 300 328 EN 301 893 AS/NZS 4268 FCC 47 CFR Part 15, Subpart C FCC 47 CFR Part 15, Subpart E FCC part 2 RSS210 RSS-Gen RSS-102

Table 14.   Safety and Electromagnetic Emissions Certificates (Continued)

Safety	EN 60950-1 IEC 60950-1 TUV-T UL 60950-1 UL 2043*
* Refer to "Installation Requirements per UL 2043 Compliance" on page 34 for installation requirements.	

Appendix B
Regulatory Statements

This appendix contains the following regulatory statements:

Federal Communication Commission Interference Statement

This 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 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.

⚠️ **Caution**
FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. ᏪᎦ E80

⚠️ **Caution**
Avertissement de la FCC: Les changements ou modifications non expressément approuvés par la partie responsable de la conformité pourraient annuler l'autorité de l'utilisateur à utiliser cet équipement. ᏪᎦ E80

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Country Code Selection (WiFi Devices)

Note
The non-US model of this product has a country code setting that must be set during the initial management session of the unit. The setting ensures that the unit operates in compliance with the laws and regulations of your country or region.

For the US model, the country code is preset and cannot be changed. Per FCC regulations, the country code setting for all WiFi products marketed in the US must be fixed to US operational channels only.

Industry Canada Statement

This device complies with RSS-210 of the Industry Canada 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.

Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

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

Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.

Caution:

(i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(ii) the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall comply with the e.i.r.p. limit; and

(iii) the maximum antenna gain permitted for devices in the band 5725-5825 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.

(iv) Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

Avertissement:

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment:

(i) les dispositifs fonctionnant dans la bande 5 150-5 250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;

(ii) le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5 250-5 350 MHz et 5 470-5 725 MHz doit se conformer à la limite de p.i.r.e.;

(iii) le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5 725-5 825 MHz) doit se conformer à la limite de p.i.r.e. spécifiée pour l'exploitation point à point et non point à point, selon le cas.

(iv) De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5 250-5 350 MHz et 5 650-5 850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

Radiation Exposure Statement:

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Europe - EU Declaration of Conformity

This device complies with Directive 2014/53/EU issued by the Commission of the European Community.

Operating Frequencies and Maximum Transmission Power Levels

The operating frequencies and maximum transmission power levels for wireless devices operated in the EU are listed below:

2412 - 2472 MHz: 19.59 dBM

5180 - 5240 MHz: 22.19 dBM

5260 - 5320 MHz: 22.29 dBM

5500 - 5700 MHz: 27.30 dBM

Operations in the 5.15 - 5.35 GHz band are restricted to indoor usage only.

Radiation Exposure Statement

This equipment complies with EU radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

	AT	BE	BG	CH	CY	CZ	DE
	DK	EE	EL	ES	FI	FR	HR
	HU	IE	IS	IT	LI	LT	LU
	LV	MT	NL	NO	PL	PT	RO
	SE	SI	SK	TR	UK		

Importer:

Allied Telesis International BV

Incheonweg 7, 1437 EK Rozenburg

Note
Contact Allied Telesis for the EU conformity statement. To contact Allied Telesis, visit our web site at **www.alliedtelesis.com/contact**.

Taiwan NCC Statement

低功率電波輻射性電機管理辦法

- 第十二條

經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

- 第十四條

低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信法規定作業之無線電通信。
低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

MPE 警語   20cm 評估超過標準值

⚠ **Warning**
電磁波曝露量 MPE 標準值 0.4023mW/cm^2，本產品使用時建議應距離人體 **20** cm

Appendix B: Regulatory Statements