



Dell Networking W-AP228 Wireless Access Point

Installation Guide

The W-AP228 is a temperature-hardened, water-resistant, indoor-rated, dual-radio IEEE 802.11ac wireless access point (AP). This access point use MIMO (Multiple-Input, Multiple-Output) technology and other high-throughput mode techniques to deliver high-performance, 802.11ac 2.4 GHz and 5 GHz functionality while simultaneously supporting existing 802.11a/b/g/n wireless services. The W-AP228 access point works only in conjunction with a Dell Networking W-Series controller.

W-AP228 Features

- Wireless transceiver
- Wireless access point (IEEE 802.11 a/b/g/n/ac)
- Wireless air monitor (IEEE 802.11 a/b/g/n/ac)
- Protocol-independent networking functionality
- Compatibility with IEEE 802.3at PoE
- Central management configuration and upgrades with a Dell controller.

Guide Overview

- [“W-AP228 Hardware Overview” on page 2](#) provides detailed hardware overview of the W-AP228 access point.
- [“Before You Begin” on page 4](#) provides key questions to ask and items to consider when deploying a wireless network.
- [“Installing the AP” on page 6](#) describes the multi-step process for successful installation and deployment of the W-AP228 access point.
- [“Safety and Regulatory Compliance” on page 11](#) provides safety and regulatory compliance information.

Package Contents

- W-AP228 Access Point
- Cable Glands x2
- USB Console Cable
- Copper Lug x1
- M4 x 8 Screw x1
- Installation Guide (this document)



NOTE: The weatherproof caps for Ethernet and Console interfaces are connected to the AP in the package.



NOTE: Mounting kits for use with the W-AP228 access point are sold separately. Contact your Dell sales representative for details.



NOTE: Inform your supplier if there are any incorrect, missing, or damaged parts. If possible, retain the carton, including the original packing materials. Use these materials to repack and return the unit to the supplier if needed.

W-AP228 Hardware Overview

Figure 1 *W-AP228 Front View*

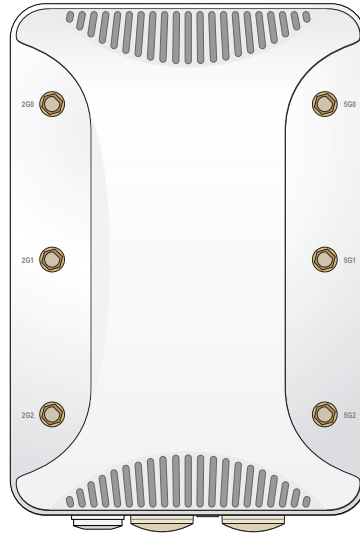
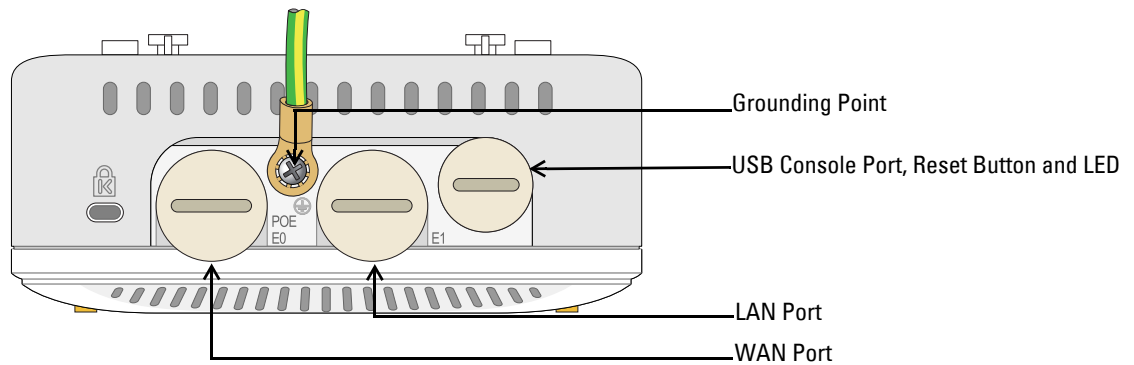


Figure 2 *W-AP228 Bottom View*



LED

The W-AP228 access point is equipped with an LED that indicates the AP system status.

Table 1 *W-AP228 LED Status during Boot Up*

LED	Color/State	Meaning
System LED	Off	No power to AP
	Red	Initial power-up
	Green - Flashing	AP booting
	Green - Steady	AP ready and 1000Mbps Ethernet link established. The LED turns off after 1200 seconds
	Green - Yellow, 6 seconds period	AP ready and 10/100Mbps Ethernet link established. The LED turns off after 1200 seconds

Table 2 W-AP228 LED Status during Operation

LED	Color/State	Meaning
System LED	Solid Red	General fault
	One blink off every 3 seconds	Radio 0 fault (5 GHz)
	Two quick blink off 0.5 seconds apart cycled every 3 seconds	Radio 1 fault (2.4GHz)

USB Console Port

The USB Micro-B console port allows you to connect the AP to a terminal or a laptop for direct local management. Use the included USB console cable to connect the AP. You can download the necessary driver for USB-UART adapter from download.dell-pcw.com under the **Tools & Resources** tab.

Use the following setting to access the terminal:

Table 3 Console Settings


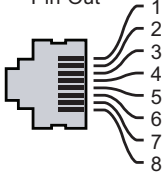
Baud Rate	Data Bits	Parity	Stop Bits	Flow Control
9600	8	None	1	None

Ethernet Ports

The W-AP228 access point is equipped with two 10/100/1000Base-T (RJ-45) Gigabit Ethernet ports (WAN and LAN port) for wired network connectivity. The WAN port supports 802.3at Power over Ethernet (PoE), accepting 48 VDC (nominal) as a standard defined Powered Device (PD) from a Power Sourcing Equipment (PSE) such as a PoE midspan injector.

These ports have RJ-45 female connectors with the pin-outs shown in [Figure 3](#).

Figure 3 Gigabit Ethernet Port Pin-Out

1000Base-T Gigabit Ethernet Port	RJ-45 Female Pin-Out	Signal Name	Function
		1 BI_DA+	Bi-directional pair +A, POE Negative
		2 BI_DA-	Bi-directional pair -A, POE Negative
		3 BI_DB+	Bi-directional pair +B, POE Positive
		4 BI_DC+	Bi-directional pair +C, POE Positive
		5 BI_DC-	Bi-directional pair -C, POE Positive
		6 BI_DB-	Bi-directional pair -B, POE Positive
		7 BI_DD+	Bi-directional pair +D, POE Negative
		8 BI_DD-	Bi-directional pair -D, POE Negative

Reset Button

The reset button can be used to return the AP to factory default settings. To reset the AP:

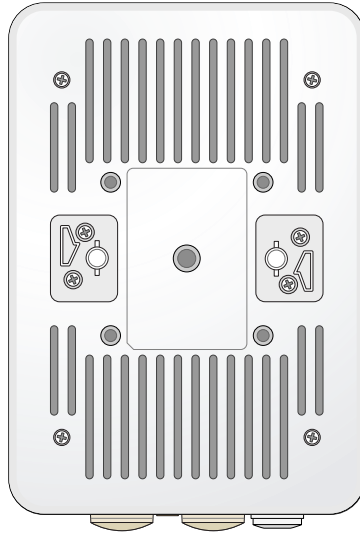
1. Power off the AP.
2. Press and hold the reset button using a small, narrow object, such as a paperclip.
3. Power-on the AP without releasing the reset button. The system LED will flash within 5 seconds.
4. Release the reset button.

The system LED will flash again within 15 seconds indicating that the reset is completed. The AP will now continue to boot with the factory default settings.

Grounding Point

Always remember to protect the AP by installing grounding lines. The ground connection must be complete before connecting power to the AP enclosure.

Figure 4 *W-AP228 Rear View*



Before You Begin



CAUTION: FCC Statement: Improper termination of access points installed in the United States configured to non-US model controllers will be in violation of the FCC grant of equipment authorization. Any such willful or intentional violation may result in a requirement by the FCC for immediate termination of operation and may be subject to forfeiture (47 CFR 1.80).

CAUTION: EU Statement:

Lower power radio LAN product operating in 2.4 GHz and 5 GHz bands. Please refer to the *Dell Networking W-Series ArubaOS User Guide* for details on restrictions.



Produit réseau local radio basse puissance opérant dans la bande fréquence 2.4 GHz et 5 GHz. Merci de vous référer au *Dell Networking W-Series ArubaOS User Guide* pour les détails des restrictions.

Low Power FunkLAN Produkt, das im 2.4 GHz und im 5 GHz Band arbeitet. Weitere Informationen bezüglich Einschränkungen finden Sie im *Dell Networking W-Series ArubaOS User Guide*.

Apparati Radio LAN a bassa Potenza, operanti a 2.4 GHz e 5 GHz. Fare riferimento alla *Dell Networking W-Series ArubaOS User Guide* per avere informazioni dettagliate sulle restrizioni.



CAUTION: To meet regulatory restrictions, the access point must be professionally installed.

Pre-Installation Network Requirements

After WLAN planning is complete and the appropriate products and their placement have been determined, the Dell controller(s) must be installed and initial setup performed before the Dell APs are deployed.

For initial setup of the controller, refer to the *Dell Networking W-Series ArubaOS Quick Start Guide* for the software version installed on your controller.

Pre-Installation Checklist

Before installing your AP, be sure that you have the items listed below:

- Gigabit Ethernet cable of required length
- IEEE 802.3at compliant PoE source
- Dell controller configured and installed on the network
- Layer 2/3 network connectivity to your AP
- One of the following network services:
 - Aruba Discovery Protocol (ADP)
 - DNS server with an “A” record
 - DHCP Server with vendor specific options



NOTE: Dell in compliance with governmental requirements, has designed the W-AP228 access point such that only authorized network administrators can change configuration settings. For AP configuration information, refer to the *Dell Networking W-Series ArubaOS Quick Start Guide* and *Dell Networking W-Series ArubaOS User Guide*.



CAUTION: Access points are radio transmission devices and as such are subject to governmental regulation. Network administrators responsible for the configuration and operation of access points must comply with local broadcast regulations. Specifically, access points must use channel assignments appropriate to the location in which the access point will be used.

Verifying Pre-Installation Connectivity

Before you install APs in a network environment, make sure that the APs will be able to locate and connect to the controller when they are powered on.

Specifically, you must verify the following conditions:

- When connected to the network, each AP is assigned a valid IP address.
- APs can locate the controller.

Refer to the *Dell Networking W-Series ArubaOS Quick Start Guide* for instructions on locating and connecting to the controller.

Identifying Specific Installation Locations

Use the AP placement map generated by Dell’s RF Plan software application to determine the proper installation location(s). Each location should be as close as possible to the center of the intended coverage area and should be free from obstructions or obvious sources of interference. These RF absorbers/reflectors/interference sources will impact RF propagation and should have been accounted for during the planning phase and adjusted for in RF plan.

Identifying Known RF Absorbers/Reflectors/Interference Sources

Identifying known RF absorbers, reflectors, and interference sources while in the field during the installation phase is critical. Make sure that these sources are taken into consideration when you attach an AP to its fixed location. Examples of sources that degrade RF performance include:

- Cement and brick
- Objects that contain water
- Metal
- Microwave ovens
- Wireless phones and headsets

Installing the AP



NOTE: Service to all Dell Networking W-Series products should be performed by trained service personnel only.

Using the AP-220-MNT-W1 Mounting Kit

The W-AP228 access point can be installed on a wall using the AP-220-MNT-W1 mounting kit.



NOTE: The W-AP228 access point does not ship with any mounting kit. The AP-220-MNT-W1 mounting kit is available as an accessory and must be ordered separately.

1. Begin by attaching the wall mount adapter to the wall.
 - a. Install any necessary wall anchors. Wall anchors are not included in the AP package or mounting kit.
 - b. Align the screw holes in the mounting bracket with the previously installed anchors or demarcated screw points.
 - c. Insert the screws to secure the mounting bracket. Screws are not included in the AP package or mounting kit.

Figure 5 *Attaching the Adapter to a Wall*

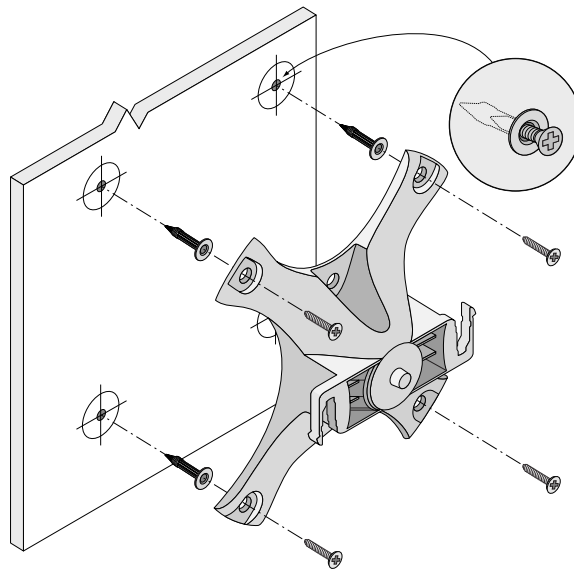
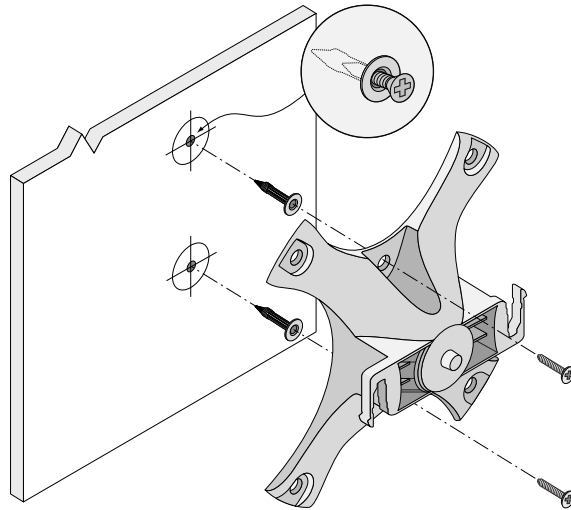


Figure 6 *Attaching the Adapter to a Wall (Alternate)*



2. Attach necessary cables and/or antennas to the AP.
3. Attach the AP to the secured mounting adapter as shown in [Figure 7](#).
 - a. Align the AP with a mounting adapter, placing the AP so that its mounting tabs are at an angle of approximately 30 degrees to the adapter.
4. Pushing toward the wall, rotate the AP clockwise until it clicks into place (see [Figure 7](#)).

Figure 7 *Attaching the AP to the Mounting Bracket*

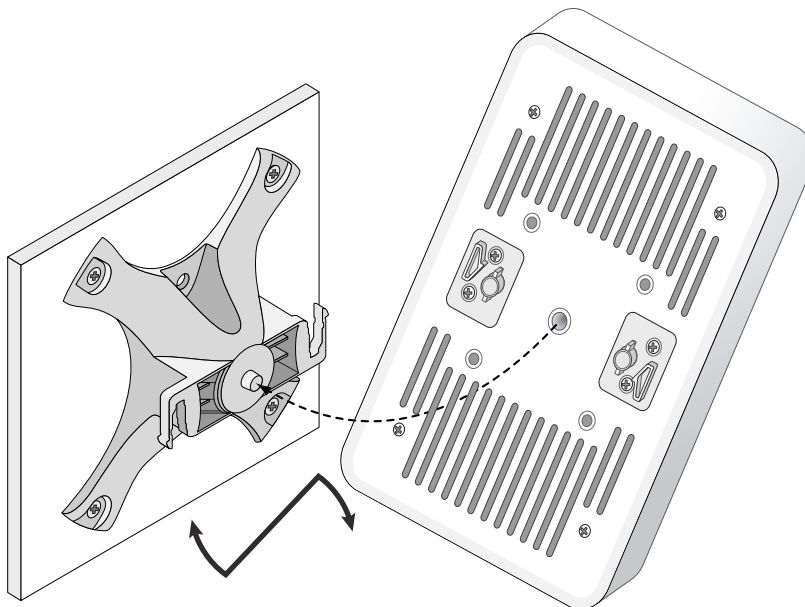
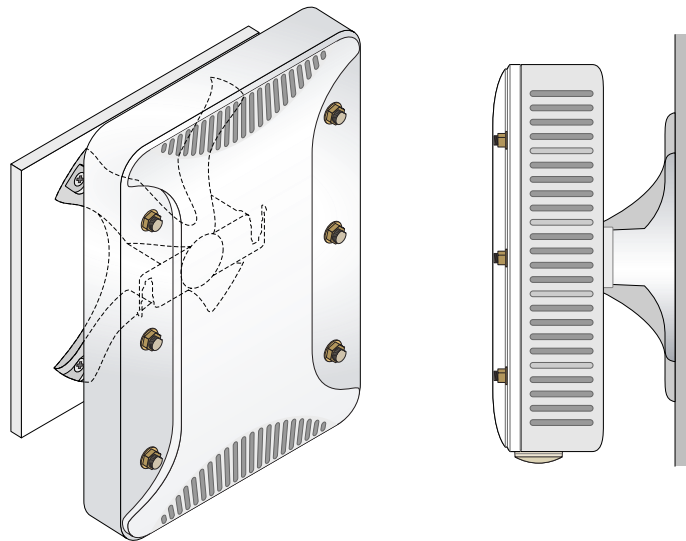


Figure 8 *Completed Installation*



Grounding the AP

After the W-AP228 access point is mounted, it must be grounded before powering up. The grounding wire should be #8 AWG.

1. Peel the cover of one end of the grounding wire and place the bare grounding wire into the included copper lug, and press firmly with the crimping pliers.
2. Fasten the copper lug to the grounding hole on the AP with the M4 x6 screw included in the AP package, as shown in [Figure 2](#).

Connecting the Ethernet Cable

To connect the Ethernet cable to the AP, perform the following steps using the cable glands that ships with your AP.

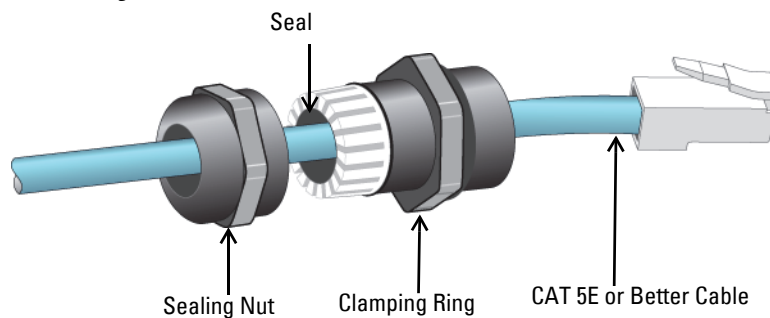


WARNING: Failure to use the included Ethernet cable glands can lead to connectivity and POE issues.



NOTE: The Ethernet cable is not included and must be purchased separately. Purchase a suitable UV-resistant, outdoor rated, CAT 5E or better RJ45 cable for use with the AP.

Figure 9 *Installing a Cable Gland*



1. Slide the sealing nut over the cable (without the RJ45 connector attached to the end).
2. Slide the clamping ring over the cable.
3. Using a crimping tool, attach the shielded RJ45 connector to the end of the cable.

4. Remove the weatherproof cap on the Ethernet port.
5. Insert the RJ45 connector to the Ethernet port.
6. Screw the clamping ring onto the Ethernet port.
7. Screw the sealing nut onto the clamping ring.



NOTE: The seal inside the clamping ring is applicable for cables with 5-8.5 mm diameter. In the cable gland kit, another seal is provided for use with the cables with 7-10 mm diameter.

Verifying Post-Installation Connectivity

The integrated LEDs on the AP can be used to verify that the AP is receiving power and initializing successfully (see [Table 1](#) and [Table 2](#)). Refer to the *Dell Networking W-Series ArubaOS Quick Start Guide* for details on verifying post-installation network connectivity.

Configuring the AP

AP Provisioning/Reprovisioning

Provisioning parameters are unique to each AP. These local AP parameters are initially configured on the controller which are then pushed out to the AP and stored on the AP itself. Dell recommends that provisioning settings be configured via the ArubaOS Web UI only. Refer to the *Dell Networking W-Series ArubaOS User Guide* for details.

AP Configuration

Configuration parameters are network or controller specific and are configured and stored on the controller. Network configuration settings are pushed out to the AP(s) but remain stored on the controller.

Configuration settings can be configured via the Dell Networking W-Series ArubaOS Web UI or CLI. Refer to the *Dell Networking W-Series ArubaOS User Guide* for details.

Product Specifications

Mechanical:

- Device Dimensions (HxWxD): 8.7 inches x 5.9 inches x 2.6 inches (221mm x 150mm x 66mm)

Electrical

- Ethernet
 - 2 x 10/100/1000Base-T auto-sensing Ethernet RJ-45 Interfaces
 - MDI/MDX
 - Power over Ethernet (IEEE 802.3at compliant), 48VDC(nominal) /0.6A
- Power
 - POE support on WAN port: 802.3at-compliant POE sourcing devices

Environmental

- Operating
 - Temperature: -40°C to 60°C (-40°F to 140°F)
 - Humidity: 5% to 95% non-condensing
- Storage
 - Temperature: -40°C to 85°C (-40°F to 185°F)

For additional specifications on this product, refer to the product data sheet on [dell.com](https://www.dell.com).

Safety and Regulatory Compliance



NOTE: For country specific restrictions and additional safety and regulatory information, refer to the multi-language *Dell Networking W-Series Safety, Environmental, and Regulatory Information* document included with your controller.

Regulatory Model Name

The regulatory model name of W-AP228 is APIN0228.

FCC

This device is electronically labeled. To view the FCC ID:

1. Log into the controller WebUI
2. Navigate to **Maintenance > Controller > About**.



CAUTION: Dell access points must be installed by a professional installer. The professional installer is responsible for ensuring that grounding is available and it meets applicable local and national electrical codes.



CAUTION: RF Radiation Exposure Statement: This equipment complies with FCC RF radiation exposure limits. This equipment should be installed and operated with a minimum distance of 9.84 inches (25 cm) between the radiator and your body for 2.4 GHz and 5 GHz operations. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Class B Part 15

This device complies with Part 15 of the Federal Communications Commission (FCC) Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.



CAUTION: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate this 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. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instructions, may cause interference harmful to radio communications.

If this equipment does cause interference, 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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for help.



EU Regulatory Conformance

Dell, hereby declares that the APIN0228 device model is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC -CE(!). The Declaration of Conformity made under Directive 1999/5/EC is available for viewing on dell.com.

Proper Disposal of Dell Equipment

For the most current information about Global Environmental Compliance and Dell products, visit dell.com.

Waste of Electrical and Electronic Equipment



Dell products at end of life are subject to separate collection and treatment in the EU Member States, Norway, and Switzerland and therefore are marked with the symbol shown at the left (crossed-out wheeled bin). The treatment applied at end of life of these products in these countries shall comply with the applicable national laws of countries implementing Directive 2002/95/EC on Waste of Electrical and Electronic Equipment (WEEE).

European Union RoHS



Aruba Networks Inc., hereby, being the manufacturer of this product, declares that all CE marked Dell wireless controller and access point products are manufactured in accordance to the provisional requirements set forth in the RoHS Directive 2011/65/EC.

A copy of the Aruba Declaration of Conformity may be obtained upon request from:

Aruba Networks International Ltd.
Building 1000,
Citygate Mahon
Cork Ireland

Please include the regulatory model number located on the product's regulatory nameplate with the request.

China RoHS



Dell products also comply with China environmental declaration requirements and are labeled with the "EFUP 10" label shown at the left.

有毒有害物质声明 Hazardous Materials Declaration

部件名称 (Parts)	有毒有害物质或元素 (Hazardous Substance)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr ⁶⁺)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板 (PCA Boards)	×	○	○	○	○	○
机械组件 (Mechanical Sub-Assemblies)	×	○	○	○	○	○

○: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T11363-2006 standard.

×: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。
Indicates that the concentration of the hazardous substance of at least one of all homogeneous materials in the parts is above the relevant threshold of the SJ/T11363-2006 standard.

对销售之目的所售产品, 本表显示, 供应链的电子产品信息产品可能包含这些物质。
This table shows where these substances may be found in the supply chain of electronic information products, as of the date of sale of the enclosed product.

此标志为针对所涉产品的环保使用期标志。某些零部件会有一个不同的环保使用期 (例如, 电池单元模块) 贴在其产品上。
此环保使用期限只适用于产品是在产品手册中所规定的条件下工作。
The Environment-Friendly Use Period (EFUP) for all enclosed products and their parts are per the symbol shown here. The Environment-Friendly Use Period is valid only when the product is operated under the conditions defined in the product manual.

India RoHS

This product complies with RoHS requirements as prescribed by E-Waste (Management & Handling) Rules, governed by the Ministry of Environment & Forests, Government of India.

Canadian Statement

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. 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 necessary for successful communication.

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.

This product complies with Canada's ICES-003 Issue 5 Class B standard.

Ce produit est conforme à la norme ICES-003 Issue 5 classe la norme B du Canada

(i) devices operating in the 5 150-5 250 MHz is reserved only for indoor use to reduce the risk of harmful interference to Mobile satellite systems using the same channels;

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) the maximum antenna gain permitted for devices using the bands 5 250-5 350 MHz and 5 470-5 725 MHz shall comply with the worst limit;

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) the maximum antenna gain permitted (for devices using the band 5 725-5 825 MHz) must comply with the limit of p.i.r.e. specified for the operation point to point and not point to point, as required

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.

In addition, users should be advised that users of high-speed cameras power are designated primary users (ie d., they have priority) for the bands 5 250-5 350 MHz and 5 650-5 850 MHz and that these radars could cause interference and / or damage to LE-LAN devices.

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.



NOTE: No emissions are permitted in the band 5 600-5 650 MHz. to further notice, the devices covered by this Annex should not be able to transmit in the band 5 600-5 650 MHz to protect radars Environment Canada weather in this band.



NOTE: Aucune émission n'est permise dans la bande 5 600-5 650 MHz. Jusqu'à nouvel avis, les dispositifs visés par la présente annexe ne doivent pas être en mesure d'émettre dans la bande 5 600-5 650 MHz, afin de protéger les radars météorologiques d'Environnement Canada exploités dans cette bande.



CAUTION: RF Declaration on the radio show: This equipment complies with IC standards to RF radiation exposure limits. This equipment must be installed and operated with a minimum distance of 7,9 inches (20 cm) between the radiator and your body for 2,4 GHz and 5 GHz operations. this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.



CAUTION: RF Déclaration sur la radio exposition: Cet équipement est conforme aux normes IC Limites d'exposition aux rayonnements RF. Cet équipement doit être installé et utilisé à une distance minimum de 7,9 pouces (20 cm) entre l'émetteur et votre corps pour 2,4 GHz et 5 GHz opérations. cet émetteur ne doit pas être colocalisées ou opérant en conjonction avec une autre antenne ou émetteur.

Canadian Caution

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Gain of antenna: 7,4dBi for 2,4G band; 9,1dBi for 5G band;

Type of antenna: directional;

Impedance of antenna: 50ohm

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain

maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Gain d'antenne: 7,4dBi for 2,4G band; 9,1dBi for 5G band;

Type d'antenne: 50 ohm, directionnel.

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Contacting Dell

Website Support	
Main Website	dell.com
Contact Information	dell.com/contactdell
Support Website	dell.com/support
Documentation Website	dell.com/support/manuals

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http://www.arubanetworks.com/open_source

Includes software from Litech Systems Design. The IF-MAP client library copyright 2011 Infoblox, Inc. All rights reserved. This product includes software developed by Lars Fenneberg, et al.

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