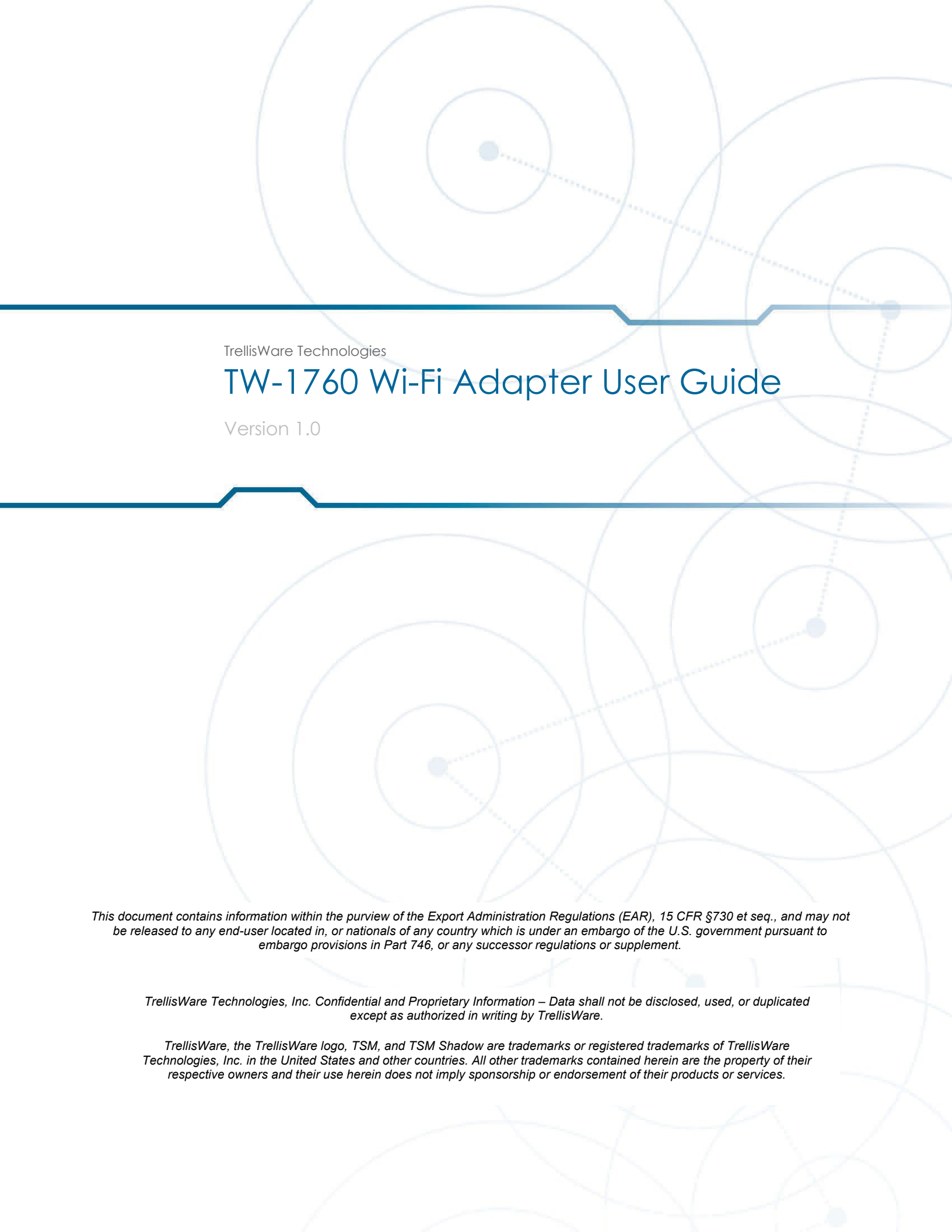


The background features a series of concentric circles in a light blue color. A solid blue line runs horizontally across the page, with a stepped, geometric cutout in the center.

TrellisWare Technologies

TW-1760 Wi-Fi Adapter User Guide

Version 1.0

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TrellisWare Technologies, 10641 Scripps Summit Court, Suite 100
San Diego, CA 92131
Phone 858-432-4851

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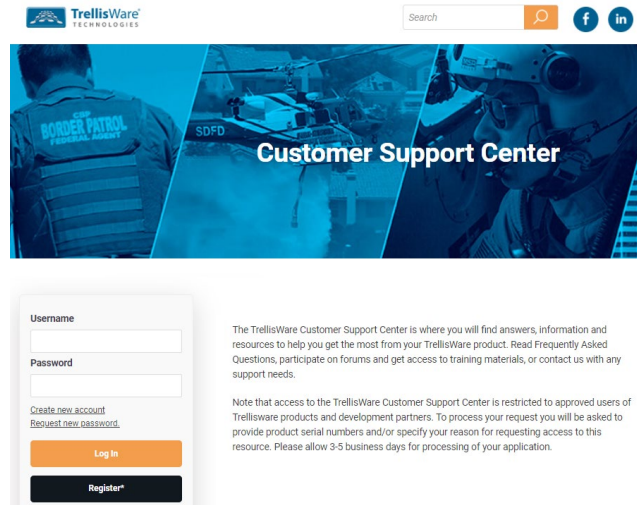
Support Center

Answers to commonly asked questions can be found at TrellisWare's Support Center:

<https://support.trellisware.com>

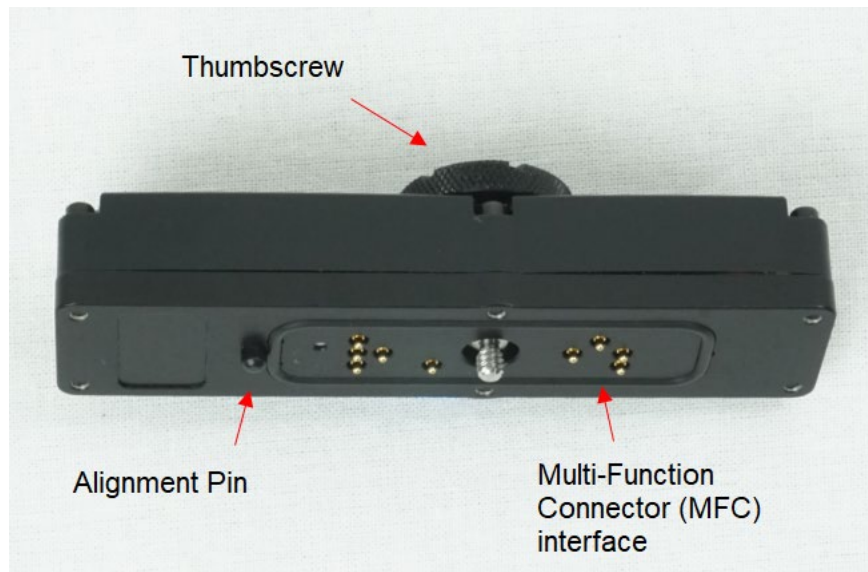
Access technical notes, documentation, and information about training and software updates.

Contact support@trellisware.com or visit us on the web.



Overview

The TW-1760 Wi-Fi Adapter acts as a Wi-Fi access point, creating a network to support data transfers between a radio in a TSM network and various Wi-Fi devices. This document discusses how to configure a Wi-Fi Adapter and introduces best practices for maximizing your adapter performance.



Relevant Products

The Wi-Fi adapter is compatible with the following TrellisWare radios:

- TW-900/950 TSM Shadow
- TW-135 TSM High-power Shadow

Basic Setup

Required Equipment:

1. PC with an 802.11b/g-capable Wi-Fi interface
2. TW-1760 Wi-Fi adapter
3. Compatible TrellisWare radio

The steps to set up the TW-1760:

1. Attach the Wi-Fi adapter to the radio.
2. Connect to the radio Wi-Fi Access Point.
Configure the Wi-Fi settings on the radio.

Wi-Fi Network Configuration

Before getting started, you must complete the pre-configuration steps for loading certificates and setting up your workstation. Please refer to **TN-0040 – Computer Pre-Configuration** for details.

Step 1: Attach the Wi-Fi adapter to the radio

1. Attach the Wi-Fi adapter to the multi-functional side connector on the radio. The alignment pin is positioned towards the top of the radio.
2. Use the thumbscrew to secure the dongle to the radio.
3. Turn the radio on (it automatically recognizes the attached adapter).
4. Once the radio has completed initialization, the Wi-Fi adapter will be operational.



Step 2: Connect to the Wi-Fi Access Point

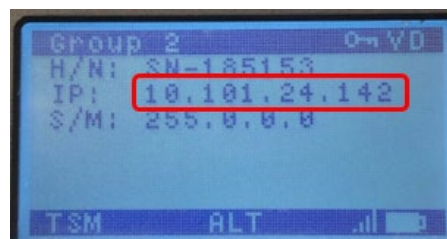
1. From the PC wireless network connection screen, locate the radio Access Point, identified as the radio serial number.
2. When prompted for a password, enter the default: *trellisware*.
3. The PC will complete the connection to the Access Point.

Step 3: Open the TrellisWare Network Controller web application to configure the radio

1. Identify the radio being used:
 - a. By serial number - located on the back or side of the radio



- b. (TW-950/TW-135 radios ONLY) By IP address - displayed in the Networking Status display on the front panel



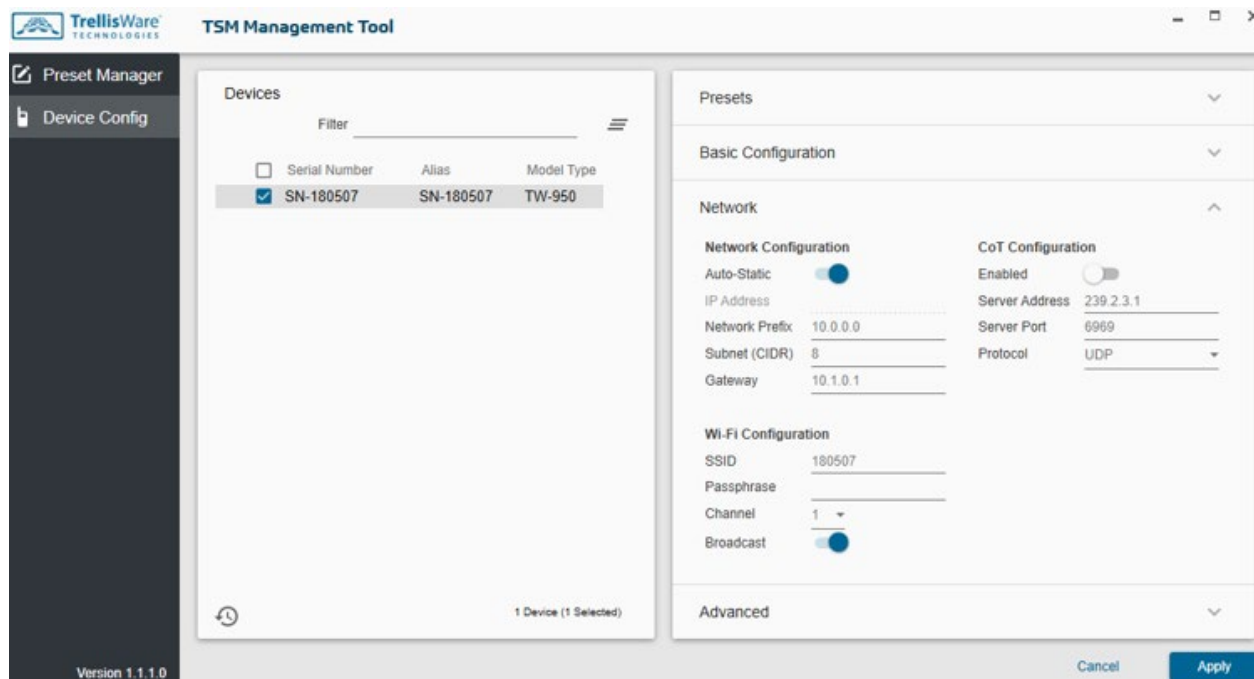
2. Enter 10.1.0.2 **OR** sn-xxxx.local (where 'xxxx' is the radio serial number) **OR** the IP address of the radio in the web browser address bar on the PC.
3. Access the TrellisWare Network Controller (TNC) web applications page. Click the **Devices** tab in the left panel and select the  **Remote Control** icon.
4. On the right side of the page, a configuration menu should populate. Scroll down and select the **Wi-Fi** drop-down, enter your desired SSID, password, Channel, Broadcast setting, and click **Save**.



5. The radio will save the changes made in the window. If you changed the password, you may have to re-join the network using the new Wi-Fi password you configured.

Step 3 (OPTIONAL): Configure Wi-Fi settings on TMT (TrellisWare Management Tool)

1. Using either the Wi-Fi adapter or an Ethernet adapter (such as the TrellisWare TW-1710), establish a network connection between the radio and PC.
2. Launch the TrellisWare Management Tool desktop application.
3. On the left panel, select **Device Config**.
4. Your radio should populate in the device list if successfully connected. Check the empty box to ensure you are configuring the preferred device.
5. On the right side of the screen, select the **Network** drop-down menu and scroll down to **Wi-Fi Configuration** settings.
6. You can make changes to the SSID, Passphrase, select a Wi-Fi channel, and switch Broadcast SSID on/off.
7. After making the desired changes, click the blue **Apply** button in the bottom right corner. The radio stores the Wi-Fi configuration information and automatically reboots.



Wi-Fi Adapter Best Practices

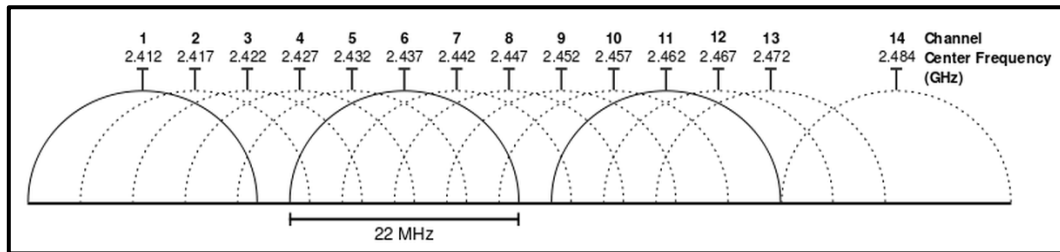
Wi-Fi Signal Strength and Range

The Wi-Fi dongle antenna radiates from the plastic window of the outer housing. Maintaining a clear path between a Wi-Fi Dongle antenna and the client provides the best connection. Signal strength can vary depending on obstructions, such as walls, bodies, metal, etc. The maximum range of the Wi-Fi Dongle is around 250 feet in line-of-sight conditions.

Wi-Fi Channel Interference Mitigation

The Wi-Fi dongle configuration sets the access point mode and channel setting to Channel 1 within the 802.11g framework. Many wireless devices, including routers, keyboards, mice, etc., default to Channel 6 from the manufacturers. Potential interference issues may be experienced if operating the Wi-Fi dongle in close proximity to these devices that communicate on a separate network using Channel 6. If available, configure your other wireless devices to operate on a different 802.11g channel. Channels 1 and 11 provide ideal non-overlapping operation with Channel 6. The diagram below shows the channel center frequency and their channel bandwidths.

The TW-1760 operates in the 2.4GHz frequency band. TrellisWare radios can also operate in this frequency range. For best performance, TrellisWare recommends using TSM operating frequencies outside of the Wi-Fi band (2400 MHz – 2485 MHz) when the Wi-Fi adapter is employed.



Wi-Fi Data Throughput

In addition to signal strength and channel contention limitations, there are additional factors that reduce achievable data rates from theoretical maximums which are advertised. The advertised rates do not account for protocol overhead that Wi-Fi connections must exchange for security and reliability, nor do they account for any high-layer protocol (e.g. TCP/IP) overhead.

Lastly, these theoretical rates compute combined upstream and downstream traffic; since Wi-Fi is half-duplex, the rate in one direction is reduced to accommodate traffic in the reverse direction. Thus, while the advertised rate for 802.11g is 54 Mbps, a robust channel operating at max capacity will deliver approximately 20 Mbps of application data in one direction.

Technical Specifications

Size	3.65" L x 0.90" W x 0.88" H in (92.7 x 11.9 x 22.4 mm)
Weight	1.7 oz (48 g)
Operating Temperature	-22 to +185 °F (-30 to +85 °C)
Ingress Protection	IP68
Wi-Fi Standards	IEEE 802.11b/g
Wi-Fi Data Rate	Up to 54 Mbps
Operating Frequency	2400 – 2473 MHz
Security	WPA2
Power Consumption	1.0 W max

Regulatory Information

TrellisWare Technologies
Model: TW-1760
Contains FCC ID: 2A6X2-1760
Contains IC: 28565-1760
CAN ICES-3 (B)/NMB-3(B)

Federal Communication Commission Interference Statement

FCC

Suppliers Declaration of Conformity

47 CFR § 2.1077 Compliance Information

Unique Identifier: TW-1760

Responsible Party – U.S. Contact Information

Name: TrellisWare Technologies Inc.

Address: 10641 Scripps Summit Court, Suite 100, San Diego, CA 92131

Website: www.trellisware.com

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. 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:

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

FCC Caution

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

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

Radiation exposure statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

Innovation, Science and Economic Development Canada Statement

This device complies with Innovation, Science and Economic Development 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.

Cet appareil est conforme aux règles d'Innovation, Sciences et Développement économique Canada. Le fonctionnement est soumis 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.

Radiation exposure statement

This equipment complies with ISSED radiation exposure limits set forth for an uncontrolled environment.

Déclaration d'exposition aux radiations

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé.

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

(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.