900 MHz Belt-Clip Radio

User's Guide

Itron

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Suggestions
If you have comments or suggestions on how we may improve this documentation, send them to TechnicalCommunicationsManager@itron.com
If you have questions or comments about the software or hardware product, contact Itron Technical Support:

Contact
- Internet: www.itron.com
- E-mail: support@itron.com
- Phone: 1 800 635 8725

Patent Notice
US and foreign patents pending

Manufacturer: Itron, Inc.
Trade name: 900MHz Belt Clip Radio
Model number: 900 BCR Radio

Compliance 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 cuse undesired operation.

Class B Part 15 Compliance Statement
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 or TV technician for help.

Industry Canada
This equipment complies with policies RSS-210 and RSS-GEN of the Industry Canada rules. Operation is subject to the following two conditions:
- This device may not cause interference, and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Note Modifications to the device or its antenna not expressly approved by the party responsible for compliance could void the user's authority to operate the device.

Transportation Classification
The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. When powered, 900MHz Belt Clip Radios are considered operating transmitters and receivers and cannot be shipped by air. All product returns must be shipped by ground transportation.

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Introduction

This document details the features and functions of the 900MHz Belt Clip Radio (BCR) and provides information relating to its use and maintenance.

Related Documents

The 900MHz Belt Clip Radio is designed for use with handheld and laptop computers running Itron mobile data collection software applications. For detailed information about these applications, see the following documents:

- *Endpoint-Link Pro Field Service Representative's Guide* (TDC-0735-xxx)

- *Endpoint-Link Endpoint Programming Guide* (TDC-0744-xxx)

- *Endpoint-Link Installation Guide* (TDC-0758-xxx)

- *Service-Link Field Service Representative's Guide* (TDC-0433-xxx)

Documentation Conventions

This guide uses the following documentation conventions:

Convention	Example
Key presses appear in **boldface**.	Press **Enter** when complete.
Menu paths appear in **boldface**.	From the **Start** menu, choose **File > Save As**. (This example instructs the user to choose **File** from the **Start** menu; then choose **Save As** from the **File** menu.)
Hypertext links appear in blue text.	See Copyright for identification information.

Warning This type of note is used to warn of potential physical harm to the user or hardware. It is critical that you pay strict attention to Warning notes, read the information carefully, and heed the advice and/or instructions.

Tip This type of note provides the user with extra hints/tips to make a task easier to perform or a concept easier to understand.

Caution This type of note advises users that failure to take or avoid a specified action could result in a loss of data.

C H A P T E R 2

900MHz Belt Clip Radio Basics

The 900MHz Belt Clip Radio is a lightweight, compact device designed for use with Itron mobile data collection software running on FC200 and FC300 series handhelds and laptop computers. It is used for reading, programming, and maintenance of Itron endpoints. Because of its size and mounting options, the 900MHz BCR is easy and comfortable to use.

Unpacking Your 900MHz Belt Clip Radio

The 900MHz BCR comes with the following items:

900 MHz Belt Clip Radio	
Charging cradle	

AC power adapter

Belt clip

Communication cable

When you unpack your BCR, make sure you have all of the components listed here. If any are missing, contact Itron Support Services immediately.

Charge the BCR's battery to 100 percent capacity (this takes about three and half hours) before using it. This helps insure the accuracy of the BCR's power gauge calculations. Frequent incomplete charges lead to progressively larger errors that only a full charge can rectify.

> ⚠️ **Caution** Use only Itron-approved and -supplied antennas with the 900MHz Belt Clip Radio. This device has been designed to operate with an antenna having a maximum gain of 2.1 dB. Antennas having a gain greater than 2.1 dB are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.
>
> Use only Itron-approved accessories with this device.

To install the battery

1. Unscrew the four screws that secure the battery compartment cover to the back of the 900MHz Belt Clip Radio.

   Remove the cover.

2. Four wires protrude from the top of the battery and end in a small connector.

Plug the connector into the socket in the top of the battery compartment.

3. Insert the battery into the compartment, carefully tucking the wires into the space above the battery.

4. Replace the compartment cover and fasten it in place with the four screws you removed in step 1.

Caution Be careful not to pinch the battery wires when replacing the cover

Turning the 900MHz Belt Clip Radio On and Off

Turn on your 900MHz BCR as soon as you have unpacked and charged it.

To conserve battery power, turn the radio off whenever you are not using it.

To turn the radio on

- Press the **ON/OFF** button (see 900MHz Belt Clip Radio Features on page 9).

  The **POWER** LED shines green for two seconds to indicate the power is on, and then it flashes to indicate the battery's power level (see Conserving the BCR's Battery). After that, all three LEDs (**POWER**, **COMM**, and **LINK**) flash in sequence, indicating the system is ready for use.

To turn the radio off

- Press and hold down the **ON/OFF** button (see 900MHz Belt Clip Radio Features on page 9) for three seconds.

  The **POWER** LED shines red for five seconds to indicate the radio is turning off.

C H A P T E R 3

900MHz Belt Clip Radio Features

The 900MHz BCR unit comes equipped with:

- An **ON/OFF** button (1) (see)
- Three LED status indicators (2) on top of the unit
- A dual-function USB communication port (3) on the bottom

Also shown here are the two contacts (4) on the bottom of the BCR through which the radio's battery is charged when the BCR is in its cradle.
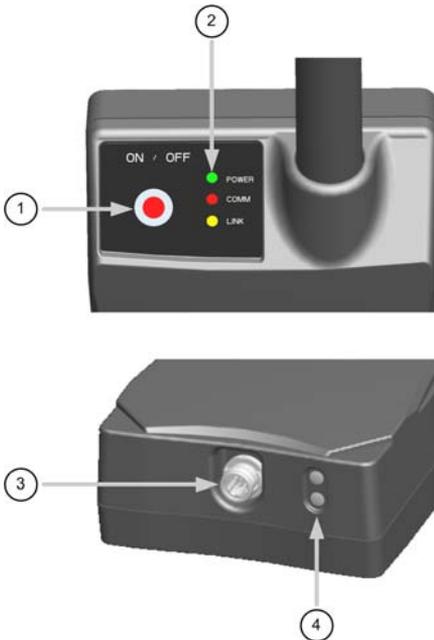
LED Status Indicators

Three LED status indicators are located on the top of the radio, labeled **POWER, COMM**, and **LINK**.

POWER LED

The **POWER** LED indicates the power status of the BCR's battery pack.
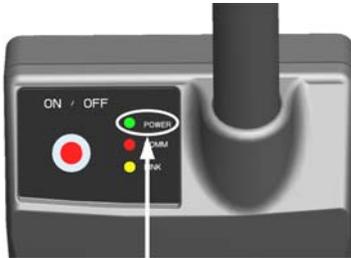
Power status	LED indicator
On/charging	Double-flashes green every two seconds
On/fully charged	Shines steady green
Off/charging	Flashes red and green alternately
Off/fully charged	No light
Low battery	Flashes red every two seconds

Tip A charging status label is affixed to the bottom of the BCR's charging cradle to help you remember the POWER LED indicators and the corresponding power statuses.

COMM

The **COMM** LED indicates the radio's Bluetooth connectivity status.
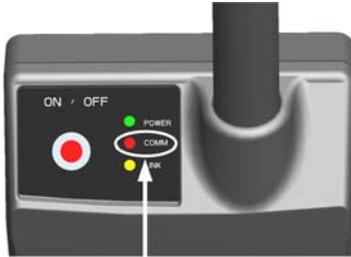
Bluetooth status	LED indicator
On and waiting to connect	Double-flashes blue every two seconds
On and connected	Single-flashes blue every two seconds
USB Connection	Flashes red every two seconds

LINK

The **LINK** LED indicates radio activity.
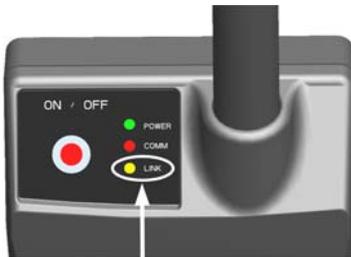
Radio activity	LED status indicator
Radio off	Unlit
Radio enabled, no actvity	Unlit
Radio activity indicated	Flashing yellow light

USB Communication Port

The 900 MHz Belt Clip Radio has one dual-function communication port on the bottom of the device.

The port provides the radio with a USB cable connection that enables it to receive both USB communications and power from a host PC.

In addition, the radio is equipped with an internal port for wireless Bluetooth communications.

> **Note** When you connect the BCR to a PC, the computer's Windows operating system may prompt you to install an updated driver for the device. If so, download the latest FTDI driver from the web site of Future Technology Devices International Ltd. (http://ftdichip.com). From the site's available D2XX direct (not virtual) drivers, select the one appropriate for your operating system (version 2.06.00 or later). Download the installation .zip file to your computer and, if needed, the corresponding installation guide.

CHAPTER 4

Mounting the 900MHz Belt Clip Radio

The 900MHz BCR's ergonomically designed belt clip provides a convenient, hands-free way to carry the BCR while installing, reading, and maintaining meters and endpoints. It lets you wear the radio comfortably while walking or driving. As a safety feature, the clip is designed to break away if the radio snags or becomes caught, releasing the wearer and reducing the likelihood of injury.

To attach and use the belt clip

1. Slide the belt clip onto the round knob on the back of the BCR until it clicks into place.

2. Clip the BCR to your belt.

    The clip is designed to keep the BCR securely attached while allowing the radio to swivel to accommodate your movements.

C H A P T E R   5

Maintaining Your 900MHz Belt Clip Radio

Your 900MHz Belt Clip Radio is rugged and water-resistant. However, you should take the following precautions to ensure that it gives you many years of reliable service.

- Do not subject the radio to extreme temperatures, such as leaving it in a vehicle in bright sunlight.
- Do not leave it in damp or dusty places.
- Do not drop your radio or subject it to severe impacts.

Warning Use the dust cover to protect the BCR's USB port the radio in dusty conditions. To insure a good seal, make sure the arrow on the cap aligns with the arrow at the top of the port.

Your BCR requires very little maintenance other than regular cleaning of its case.

To clean the BCR case

1. Wipe the radio's case with a damp cloth.
2. Use a soft-bristle brush to remove stubborn deposits. Treat the keypad gently.
3. Blow any water out of the connectors, and then leave the radio to drain and air-dry.

Warning Never use solvents of any kind on the case or keypad. Do not expose it to temperatures above 140° F (60° C).

Battery Overview

The 900MHz Belt Clip Radio uses a rechargeable lithium-ion (Li-Ion) battery pack as its main power source whenever it is not receiving power through its cradle or USB cable.

Warning Do not use any power source other than the Itron-recommended battery. Using another power source could damage the BCR.

Charge the BCR's battery to 100 percent capacity (this takes about three and half hours) before using it. This helps insure the accuracy of the BCR's power gauge calculations. Frequent incomplete charges lead to progressively larger errors that only a full charge can rectify.

Besides powering the 900MHz BCR from an external AC power source when the BCR is inserted in its cradle, the AC power adapter also charges the device's batteries. Whenever possible, connect the cradle to an AC electrical outlet and insert the BCR into the cradle to conserve the battery pack's charge.

When using the cradle is not an option or is not practical, you can charge the battery pack through the USB cable, which draws power from a host computer as well as enabling USB communications with the computer. The BCR does not draw power through the USB cable when it is being powered through the cradle.

Itron recommends the following practices to ensure long battery life:

- Charge the radio at room temperature (approximately 68° F/20° C) for best results.
- Charge the radio at the end of each work day.
- Check the charge status at the beginning of each work day.

Tip The battery will not charge in an environment that is 32º F/0º C or less.

To check the battery's power level

1. Make sure the BCR is turned off completely.
2. Press the **ON/OFF** button for less than one second (see 900MHz Belt Clip Radio Features on page 9).

   The **POWER** LED (see POWER LED) flashes to indicate the battery's power level, as described in the following table:

Power level remaining	PWR LED power indicator
90% or more	Four green flashes
75% or more	Three green flashes
50% or more	Two green flashes
25% or more	One green flash
25% or less	Four red flashes

After it indicates the power level, the BCR runs through an LED test cycle.

To charge the battery through the USB cable

1. Connect the Hirose connector (1) on one end of the USB cable to the BCR's communication port (see USB Communication Port).

2. Connect the USB connector (2) on the opposite end to your PC's USB port.

When the BCR is connected to a PC through its USB cable, but not drawing power through its cradle (see To charge the battery through the cradle), the USB cable provides the BCR with power from the PC as well as USB communications.

Tip The charge time may be much longer through the USB cable than through the AC adapter and cradle, as the PC can supply only limited power.

Bluetooth communication is not possible when the USB cable is connected.

To charge the battery through the cradle

1. Plug one end of the AC adapter to the corresponding socket in the back of the the cradle.
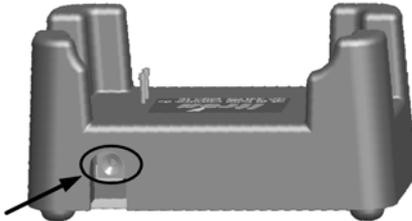
Caution Use only an Itron-approved AC adapter with a 12-volt, 3.5 amp input power rating with this device.

2. Plug the other end into an AC electrical outlet.
3. Insert the BCR into the cradle.

When the BCR is plugged into the (powered) cradle, the cradle provides it with power. While the radio is in the cradle, Bluetooth communication is possible, as long as the USB cable is not connected to the radio. If the USB cable is connected (see To charge the battery through the USB cable), the radio still draws power from the cradle, but communication can take place only through the USB cable, and Bluetooth communication is disabled.

Replacing the Charging Cradle's Contact Pins

If the contact pins on the charging cradle become bent or broken, you can easily replace them. Use your fingers or a pair of needle-nosed pliers to remove the damaged pins and insert new ones in the empty holes.

Spare or replacement contact pins are available directly from Itron customer service representatives (part number 320-0167-002). Use only replacement pins provided by Itron with the 900MHz Belt Clip Radio charging cradle.

Storing Your 900MHz Belt Clip Radio

Your 900MHz Belt Clip Radio can be safely stored for two weeks or less with simple preparation. Follow the steps below to prepare your BCR for short-term storage.

Remove the battery before storing the device for longer periods.

To store your BCR

1. Connect the BCR to external power and allow the battery pack to fully charge.

   - If the radio is on, the POWER LED flashes green twice (quickly) every two seconds while charging. When it shines steadily green, charging is complete.

- If the radio is off, the POWER LED flashes alternately red and green while charging. It stops flashing and the light goes off when charging is complete.

See LED Status Indicators on page 10.

2. Remove external power, exit all applications, and turn off the unit before placing it in storage.

Upon removal from storage, the battery pack requires additional charging.

> **Note** Remove the BCR's battery before storing the device for periods longer than two weeks.

Daily Operation

Itron recommends the following daily measures to help maximize the service life of your 900MHz Belt Clip Radio and resolve any problems you might experience.

- At the beginning of each day of operation, inspect the radio for broken, loose, or missing parts and fasteners, taking corrective action as required.

- Make sure the BCR is operated and stored within the recommended temperature range.

  – Operating temperature: -4° F to 140° F (-20° C to 60° C)

  – Storage temperature: -40° F to 158° F (-40° C to 70° C)

  Cold temperature extremes may result in reduced available energy from the battery pack. This energy is recoverable as the battery pack warms to 68° F (20° C).

  Do not subject the radio to extreme temperatures, such as leaving it in a vehicle in bright sunlight. Extended exposure to warm temperature extremes can result in permanent reduction in available energy from the battery pack.

  Charging is disabled below 32° F (0° C) and above 113° F (45° C) to protect the lithium-ion batteries.

- Conserve battery pack energy when possible to maximize battery life during daily use.

  Shallow or partial discharge and charge cycles are preferred, rather than allowing the battery pack to drain completely before recharging it.

  Charging after a shallow or partial discharge does not degrade battery pack life or performance.

- Exit all external applications at the end of each work day.

  This ensures that all applications that have initiated communications with the BCR have terminated their Bluetooth links.

C H A P T E R   6

Safety

Your 900MHz BCR is ergonomically designed for safe, comfortable use. However, as with all equipment, you should follow good working practices while using it.

Some people experience discomfort while using electronic equipment. If ignored, this discomfort can lead to repetitive stress injury (RSI), also known as cumulative trauma disorder or repetitive motion injury.

Minimize the risk by following these guidelines:

- Maintain good posture while using the radio. Keep your fingers and body relaxed whenever possible.

- Avoid keeping your muscles tense for long periods. Change tasks often to avoid prolonged muscle strain. Support the radio while using it.

- Take frequent short breaks. Use these breaks to exercise the muscles in your hands, arms, shoulders, neck, and back.

AC Power Adapter

The 900MHz BCR's AC power adapter (see Unpacking Your 900MHz Belt Clip Radio on page 3) is safe and simple to use.

Follow these instructions to help insure your safety and extend the life of the adapter:

- Use the adapter indoors only.

- Avoid spilling liquid on the adapter.

  Do not connect it if it is damp.

- Make sure ventilation around the adapter is not restricted while it is in use.

- Use only the AC adapter supplied with your 900MHz BCR.

  Do not substitute an alternative or unapproved adapter; this may damage the BCR and void the warranty.

- Inspect the AC adapter before use.

  Do not use it if there are any signs of damage or deterioration.

- Make sure all connectors are firmly connected.

- Avoid mechanical strain to cables and connectors.

- Make sure the adapter's green LED is lit while the adapter is in use.
- In the event of overloading, the AC adapter is designed to be fail-safe and may stop functioning.
- Do not try to use the AC adapter to power any other equipment.
- Avoid use in dusty, damp, or contaminated environments.

Warning The AC power adapter contains hazardous voltage. It contains no user-serviceable parts. Do not try to open or modify it.

C H A P T E R 7

Troubleshooting

If you have a problem with your 900MHz Belt Clip Radio, review the appropriate troubleshooting steps listed below. After that, if the problem remains unresolved, contact an Itron customer service representative (e-mail: support@itron.com; phone: 1 800 635 8725).

Problem	Possible Solutions
Battery does not charge	• Verify the connection and power to the charging cradle (if used). • Check that the BCR is fully seated in the cradle (if used). The BCR should turn on when connected to external power, and the **POWER** LED should flash. • Check the cradle's contact pins for damage, and make sure they touch the contacts on the bottom of the BCR when you place the device in the cradle. Replace the pins if they are damaged (see Replacing the Charging Cradle's Contact Pins on page 19). • If charging through the USB cable, try a different USB port on the PC. The port may be bad or incapable of providing sufficient current for charging. • Check the battery charge information through the mobile data collection application on the handheld or laptop data collector connected to the BCR. Make sure there are no errors or anomalies.

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Battery power drains quickly	• Make sure the battery indicates a full charge following an overnight charge (see Power Indicator LED). • Typical useful life of the BCR battery pack is between 300 and 500 charge/discharge cycles. Replace the battery when its capacity drops to 70 percent of its original capacity. • If the battery's power does not last following a full charge, return the BCR to an approved Itron service center to have its battery replaced.
USB connection problems	• Visit the FTDI website and download the latest drivers that support FT232R devices. • Install drivers
Bluetooth connection problems	• See your application's user guide for setup information.

Optimizing Bluetooth Performance

To optimize the performance of Bluetooth communication between the 900MHz Belt Clip Radio and its host computer, keep the following points in mind.

• Bluetooth communication works best when the communicating devices have a line-of-sight orientation—that is, when you have an unobstructed view from one device to the other. When possible, remove or reduce obstacles between the 900MHz Belt Clip Radio and its host computer during Bluetooth communication.

• The BCR's internal Bluetooth antenna emits its strongest signal through the front of the device. Try to face the BCR toward the computer during Bluetooth communication.

• The internal location of a computer's Bluetooth device varies between different computer models. Changing the host computer's orientation toward the BCR may improve Bluetooth communication.

- Keep metal objects away from the BCR and its antenna during Bluetooth communication. They can impede the Bluetooth signal and hurt performance.

- Because of the way the Bluetooth communication protocol works, communicating devices must be closer to each other when they first establish communication than they must be to maintain the connection afterwards. If the connection fails between the BCR and the computer, you may have to move closer to reconnect.

A PPENDIX A

900MHz Belt Clip Radio Capabilities and Limitations

Equipment Description

Model: 900MHz Belt Clip Radio
FCCID: EO9BCR900
IC ID: 864A-BCR900

900MHz Belt Clip Radio

Transmitter Information
Transmit frequency MAS: 952 MHz–957 MHz
Transmit frequency ISM: 908 MHz–923.8 MHz
MAS transmitter conducted power: +22 dBm
ISM transmitter conducted power: +10.5 dBm
Transmitter gain: Firmware controlled; +30dB maximum
Antenna type: omnidirectional
Antenna transmitter gain: 2.0dBi
Transmission duration: Check ERT function: Keyed transmit lasting between 1.25 and 7 seconds initiated on demand from operator. Duration is dependent on the success of the communications event with the endpoint.
Receiver Information
Frequency ISM: 908–923.8 MHz
Receiver gain: Firmware controlled: 26dB minimum
Antenna type: Omnidirectional
Antenna receive sensitivity: -112.45 dBm

Bluetooth

Manufacturer: BlueGiga
Model: WT11-A
FCC ID: QOQWT11
IC ID: 5123A-WT11-E
Transmitter Information
Transmitter class: Class 2
Transmit frequency: 2400 MHz–2483.5 MHz, spread spectrum
Transmitter power (max): +14 dBm to +18 dBm
Transmitter power (min): –11 dBm to –9 dBm
Antenna type: integral
Transmission type: data
Modulation type: GFSK, DQPSK
Signal information: Bluetooth
Receiver Information
Frequency: 2400 MHz–2483.5 MHz
Antenna type: integral, chip
Antenna receive range: –82 dBm to –20 dBm

Specific Absorption Rate Data

This model of the 900BCR meets the government's requirements for exposure to radio waves.

Your 900BCR has a radio transmitter and receiver. It is designed and manufactured not to exceed limits for exposure to radio frequency (RF) energy set by the Federal Communications Commission (FCC) of the U.S. government and by the Canadian regulatory authorities. These limits are part of comprehensive guidelines and establish permitted levels of RF energy for the general population. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons, regardless of age or health.

The exposure standard for wireless mobile and/or portable devices employs a unit of measurement known as the specific absorption rate, or SAR. The SAR limit set by the FCC and by the Canadian regulatory authorities is 1.6 W/kg[1]. Tests for SAR are conducted using standard operating positions accepted by the FCC and by Industry Canada with the 900BCR transmitting at its highest certified power level in all test frequency bands. Although the SAR is determined at the highest certified power level, the actual SAR level of the 900BCR while operating can be well below the maximum level. This is because the 900BCR is designed to operate at multiple power levels, depending on the needs of the customer.

Before a BCR model is available for sale to the public in the U.S. and Canada, it must be tested and certified to the FCC and Industry Canada that it does not exceed the limit established by each government for safe exposure. The tests are performed in positions and locations (for example, worn on the body) and reported to the FCC and made available for review by Industry Canada. The highest SAR value for this model BCR when tested for use when worn on the body as described in the user's guide is 0.314 W/kg. While there may be differences between the SAR levels of various BCR models and at various positions, they all meet the government requirements for safe exposure. Please note that improvements to this product model could cause differences in the SAR value for later products; and in all cases, products are designed to be within the guidelines.

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[1] In the United States and Canada, the SAR limit for wireless mobile and/or portable devices used by the public is 1.6 W per kilogram averaged over 1 g of tissue. The standard incorporates a substantial margin of safety to get additional protection for the public and to account for any variations in measurements.

 Warning Use this device only in a manner consistent with this user's guide.