



User Manual
SiteWERX Location Node

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1. Scope

This document provides user information for the SiteWERX Location Node. Information is included regarding safety, technical features, installation, and operating constraints

1.1 Safety Instructions

- a. Read the manual carefully before use.
- b. The node and power supply shall be installed according to the installation instructions.
- c. The node and power supply are for indoor use only.
- d. The AC power cable plug has three pins. The third pin is for maintaining the chassis at ground potential. Do not remove it.
- e. Do not over load the power supply. Refer to paragraph xx for proper load levels.
- f. Ensure that power is OFF during installation procedures.
- g. All maintenance and servicing should be performed or supervised by qualified service personnel.
- h. To satisfy RF exposure requirements, this device and its antenna must operate with a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

1.2 Contact Information

This product is manufactured by:

WirelessWERX, Inc.
100 Chaparral Court, Suite 100
Anaheim, CA 92808
Phone: 714-685-9776
Fax: 714-685-9270

2. Description

The SiteWERX Location system consists of System Management software residing on a networked PC, a Base Station, and one or more SiteWERX Location Nodes (SLN's), Figure 1.

The Base Station and SLN's form a communication chain (scatternet) using Bluetooth radios. The Base Station maintains a communication link with the Management Console, allowing the system to be managed by a PC. Mobile devices, such as cell phones and PDAs, running the SiteWERX Mobile Client (SMC) software are able to communicate with an SLN to receive location and real-time messages, reference Figure 1.

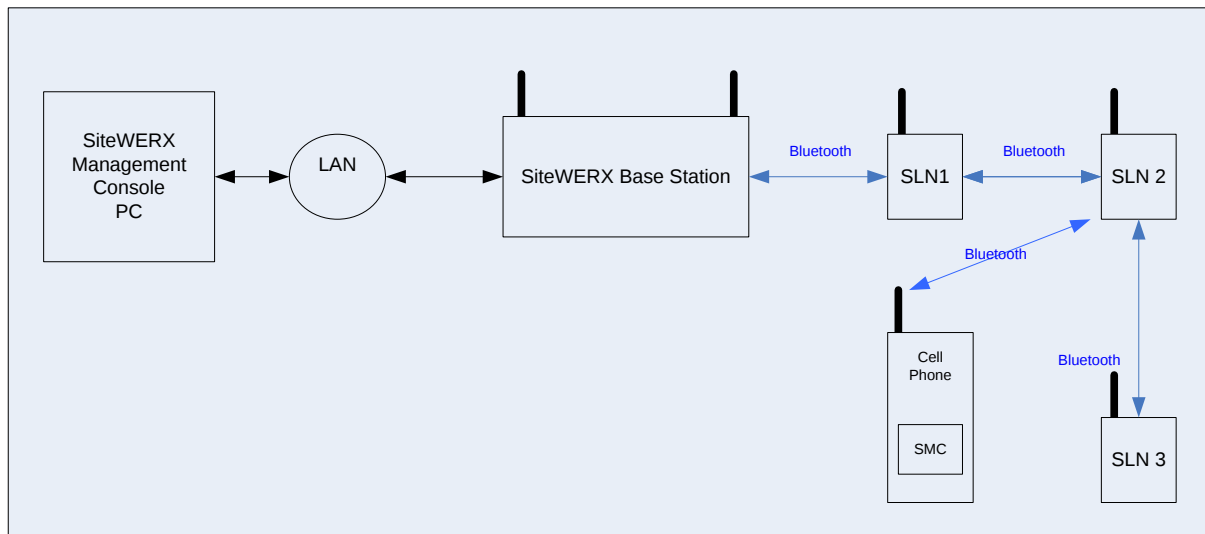


Figure 1. SiteWERX Location System

2.1 SiteWERX Location Node (SLN)

The SLN has the following functional capabilities.

- a) Operates as a Bluetooth device in accordance with the Bluetooth 2.0 + EDR
- b) Establishes wireless links with other Bluetooth devices in proximities of 1 to 10 meters
- c) Transmits area-specific information to other Bluetooth devices in support of precision location
- d) Transmits and receives information to and from other Bluetooth devices in support of system administration, status and diagnostics, and alarm/alert situations.

2.1.1 Architecture

The SiteWERX Location Node module consists of a Bluetooth Module for Bluetooth operations, an antenna, and a voltage regulator. A functional block diagram of the SiteWERX Location Node is shown in Figure 2

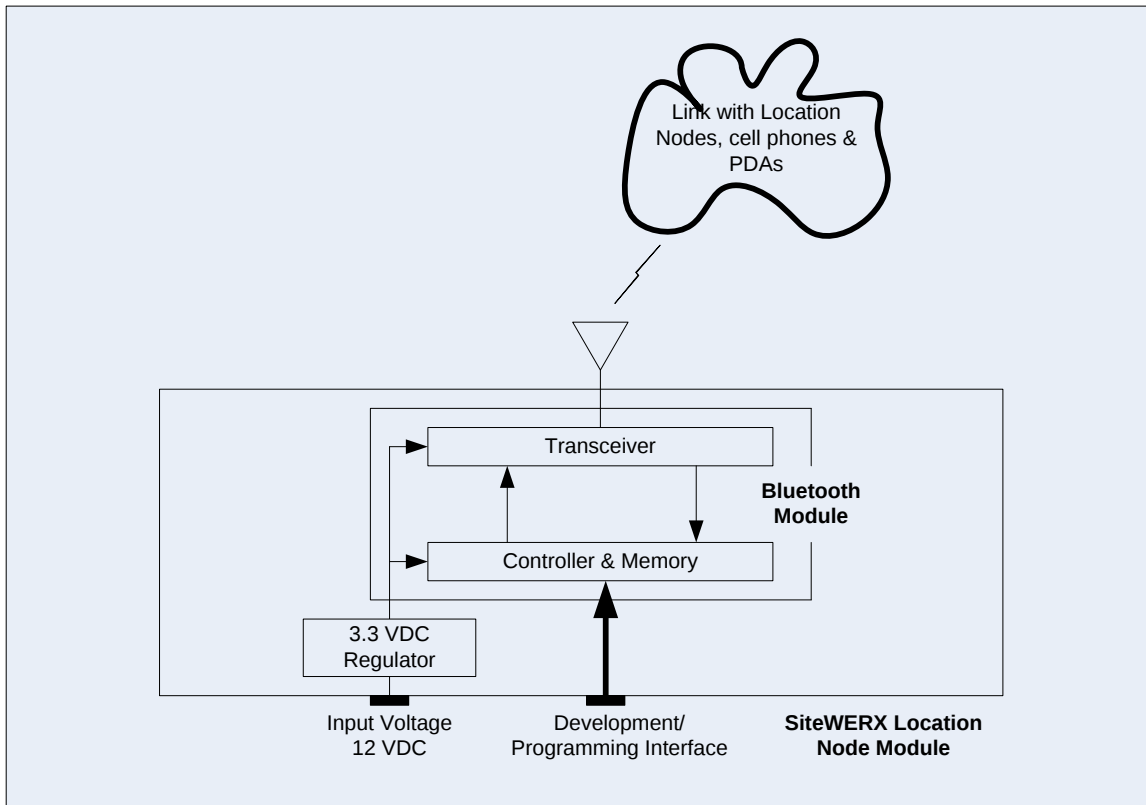


Figure 2. SiteWERX Location Node Block Diagram

2.1.2 Bluetooth Module

The SLN has a CSR BlueCore4-External radio to provide the operating parameters and protocols required by the Bluetooth 2.0 + EDR Core Specification.

2.1.2.1 Radio Characteristics, Basic Data Rate

<u>Receiver</u>	<u>Typical</u>	<u>Bluetooth Spec</u>	<u>Unit</u>
Sensitivity @ 0.1% BER	- 83	$\leq$ - 70	dBm
<u>Transmitter</u>	<u>Typical</u>	<u>Bluetooth Spec</u>	<u>Unit</u>
Max RF Transmit Power	+ 4	- 6 to + 4	dBm

2.1.2.2 Radio Characteristics, Enhanced Data Rate

<u>Receiver</u>	<u>Typical</u>	<u>Bluetooth Spec</u>	<u>Unit</u>
Sensitivity @ 0.1% BER	-83	$\leq$ - 70	dBm
<u>Transmitter</u>	<u>Typical</u>	<u>Bluetooth Spec</u>	<u>Unit</u>
Max RF Transmit Power	+ 4	- 6 to + 4	dBm

2.1.3 Operating Voltage and Current

The SLN is connected to a power distribution network powered by an AC/DC converter.

The SLN operates with an input of 6 to 15 volts DC, and has a maximum operating current of $\leq$ 0.070 Amps.

A voltage regulator provides 3.3 volts DC to the Bluetooth module

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2.1.4 Antenna

The SLN has an embedded dipole antenna for the transmission and reception of Bluetooth Radio-Frequency (RF) Signals. The antenna is an Antenna Factor chip antenna, ANT-2.45-CHP-x. The antenna physical dimensions are shown in Figure 3. The radiation pattern is shown in Figure 4.

The antenna has linear polarization, a 50 ohm input impedance, and is capable of transmitting a continuous output of ≥ 3 watts.

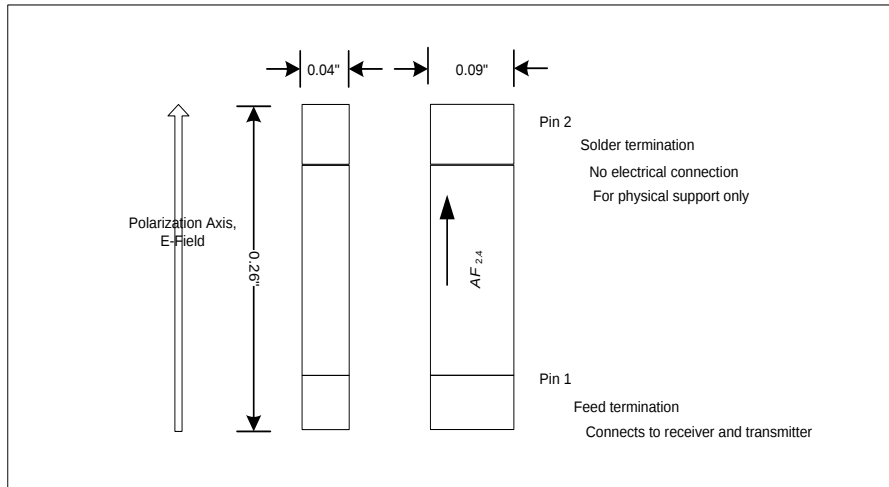


Figure 3. SLN Antenna Dimensions

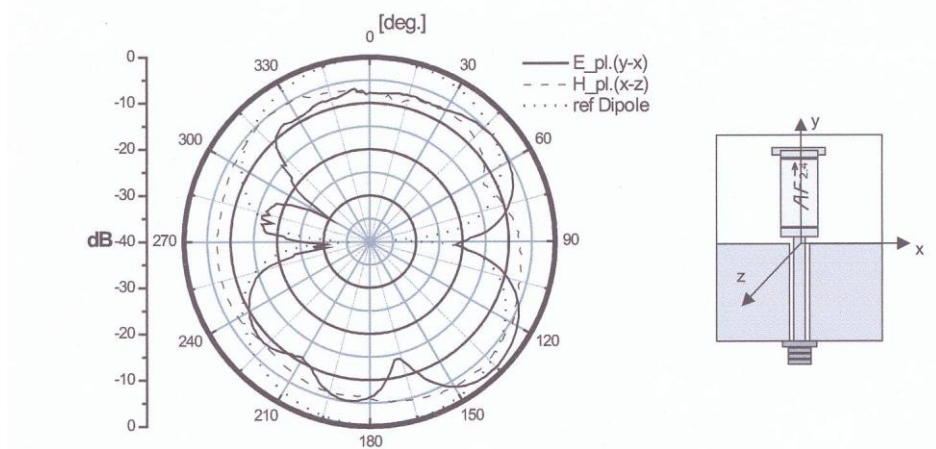


Figure 4. Antenna Radiation Pattern

2.1.5 Development/Programming Interface

The SLN is programmed using a dedicated four-wire serial peripheral interface (SPI). The SPI is also used for real-time debugging / development, and is connected to a PC parallel port via connector and cable assembly made by WirelessWERX.

2.1.6 Status Indicators

The SLN has two LED status indicators. One RED LED is illuminated when power is on. A second GREEN LED is illuminated when the Network status is positive.

2.1.7 Enclosure

The SLN assembly consists of a PCB mounted in an enclosure 3.0" x 2.5" x 1.5". The enclosure material is Polylac-747, an ABS. The enclosure wall thickness is as thin as practical to minimize Radio Frequency signal attenuation and reflections.

2.1.8 Environment

The SLN allowable environments for operating and storage are as follows:

Operating Temperature	-40 to +70 C
Storage Temperature	-40 to +85 C
Operating Humidity	5% to 80% RH, non-condensing

3. Constraints

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.

Instruction to the User

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.

Operation with non-approved equipment is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

4. Reference Documentation

Bluetooth 2.0 + Enhanced Data Rate (EDR)

BlueCore4-External DataBook

Antenna Factor Antenna, ANT-2.45-CHP-x Datasheet

Case Material Datasheet, Polylac-747

4.1 Acronyms/Abbreviations

AC	Alternating Current
dBi	Decibels referenced to an isotropic radiator operating at the same frequency

dBm	Decibels referenced to One milliWatt
DC	direct current
EDR	Enhanced Data Rate
GPS	Global Positioning System
I/O	Input /Output
mA	milliAmperes
Mbps	Megabits per second
PCB	Printed Circuit Board
SBS	SiteWERX Base Station
SLN	SiteWERX Location Node
SPI	Serial Peripheral Interface
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VAC	Volts, Alternating Current
VDC	Volts, Direct Current