User Manual
SiteWERX Base Station, Wireless

1 June 2009

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1. Scope

This document provides user information for the SiteWERX wireless Base Station (SBS-W). Information is included regarding safety, technical features, installation, and operating constraints

1.1 Safety Instructions

a. Read the manual carefully before use.

b. The Base Station shall be installed according to the installation instructions.

c. The Base Station is for indoor use only.

d. Ensure that power is OFF during installation procedures.

e. All maintenance and servicing should be performed or supervised by qualified service personnel.

f. 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 Bluetooth / WIFI Base Station, and one or more SiteWERX Location Nodes (SLN's).

The SBS-W and SLN's form a communication chain (scatternet) using Bluetooth radios. The SBS-W uses an 802.11 WIFI module to maintain a communication link with a local area network, allowing the system to be managed by a PC with access to this LAN. Mobile devices, such as cell phones and PDAs, running the SiteWERX Mobile Client (SMC) are able to communicate with an SLN to receive location and real-time messages, reference Figure 1.

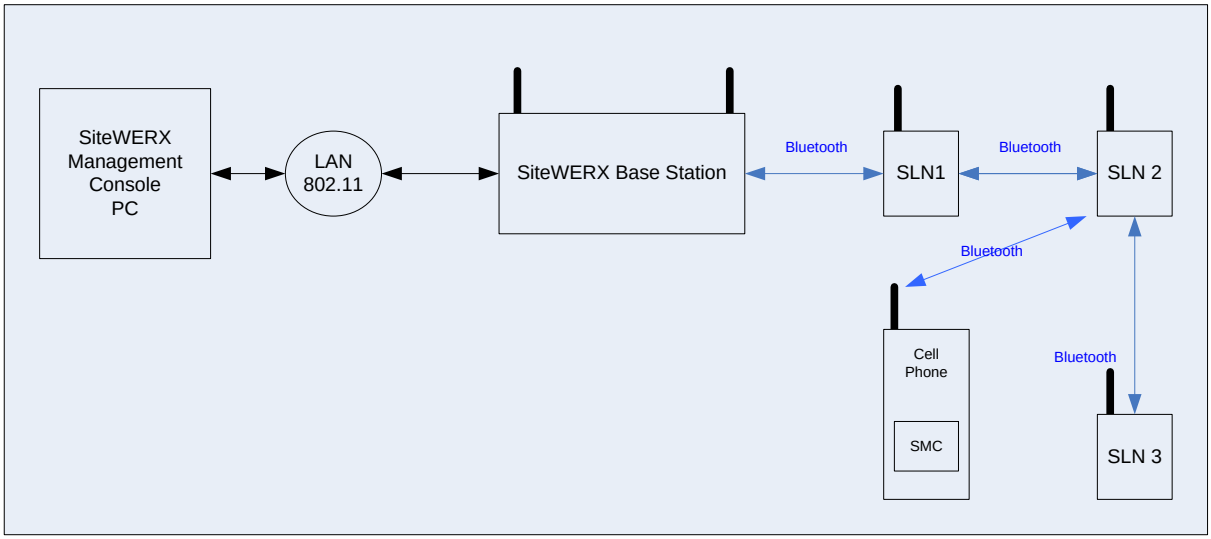

Figure 1 SiteWERX Location System

2.1 SiteWERX Base Station, Wireless

The SBS-W has the following functional capabilities:

a) Operate as a Bluetooth device in accordance with the Bluetooth 2.0 + EDR
b) Establish wireless links with other Bluetooth devices in proximities of 1 to 10 meters
c) Transmit area-specific information to other Bluetooth devices in support of precision location
d) Transmit information to, and receive information from other Bluetooth devices in support of system administration, status and diagnostics
e) Transmit Real-Time Alerts
f) Establish Ethernet link with System Management Console

2.2 Architecture

The SBS-W consists of a Bluetooth Module and antenna for Bluetooth operations, and a WI-FI controller, transceiver and antenna for communications with the SiteWERX Controller. A functional block diagram of the SBS-W is shown in Figure 2

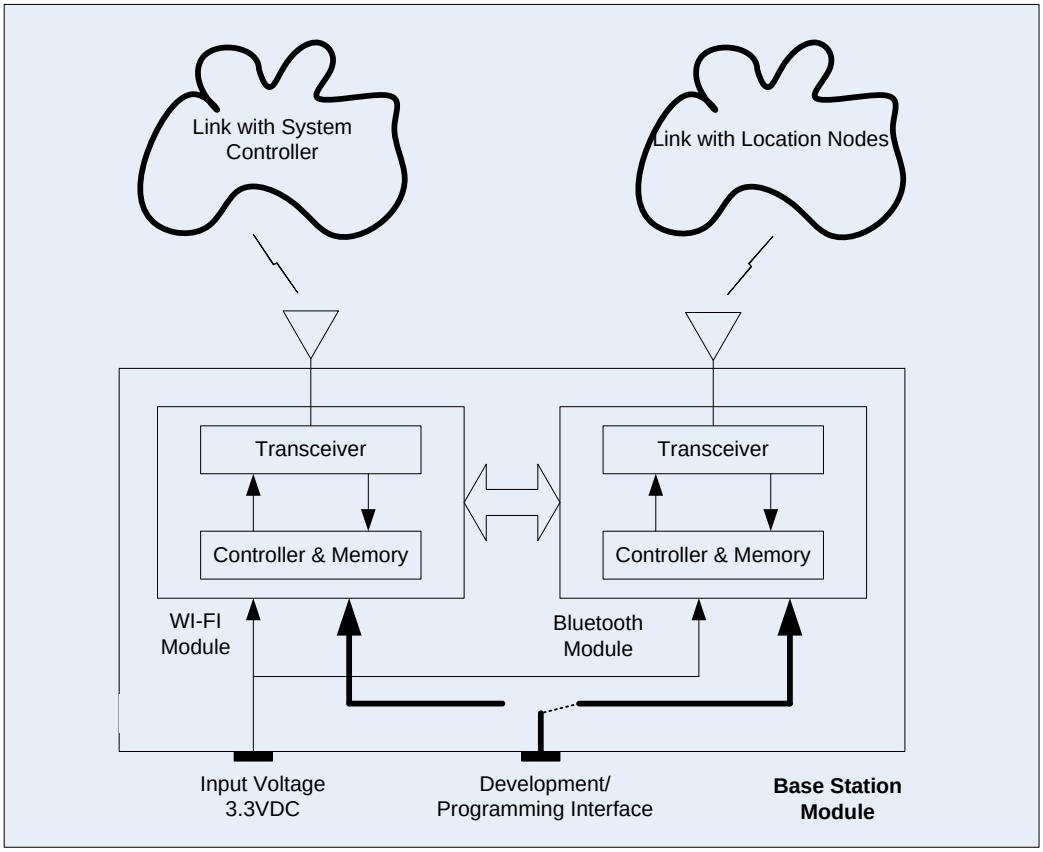

Figure 2. SiteWERX Base Station, Wireless Block Diagram

2.2.1 Bluetooth Module

The Bluetooth Module provides the operating parameters and protocols required by the Bluetooth 2.0 + EDR Core Specification.

2.2.1.1 Radio Characteristics, Basic Data Rate

Receiver	**Typical**	**Bluetooth Spec**	**Unit**
Sensitivity @ 0.1% BER	- 83	≤ - 70	dBm

Transmitter	**Typical**	**Bluetooth Spec**	**Unit**
Max RF Transmit Power	+ 4	- 6 to + 4	dBm

2.2.1.2 Radio Characteristics, Enhanced Data Rate

Receiver	Typical	Bluetooth Spec	Unit
Sensitivity @ 0.1% BER	- 83	≤ - 70	dBm

Transmitter	Typical	Bluetooth Spec	Unit
Max RF Transmit Power	+ 4	- 6 to + 4	dBm

2.2.2 WI-FI Module

The SBS-W has a WI-FI Module to provide the operating parameters and protocols required by the IEEE 802.11 b/g wireless standard.

2.2.2.1 Radio Characteristics

Receiver	Typical	Data Rate
Sensitivity @ 0.1% BER	- 69 dBm	54 Mbps
	- 88 dBm	11 Mbps
	- 91 dBm	1.0 Mbps

Transmitter	Typical	Unit
RF Transmit Power	11 to 16	dBm

Data Rates 1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, 54 Mbps

2.2.3 Voltage and Operating Current

The SBS-W module operates with an input of 3.3 VDC and a max current ≤ 700 mA .

2.2.4 Antenna

The SBS Module has two identical antennas. One for the transmission and reception of Bluetooth Radio-Frequency (RF) Signals, and one for the transmission and reception of WI-FI Radio-Frequency (RF) Signals.

The antennas are 4 inch dipoles with a 50 ohm impedance, and a max gain of 2.89 dBi, Figure 3.

The SBS antennas are capable of transmitting a constant 1.0 watt.

The SBS antennas have a right angle, reverse polarity SMA connector.

The SBS antennas are adjustable and normally operate with the primary axis aligned with the local vertical.

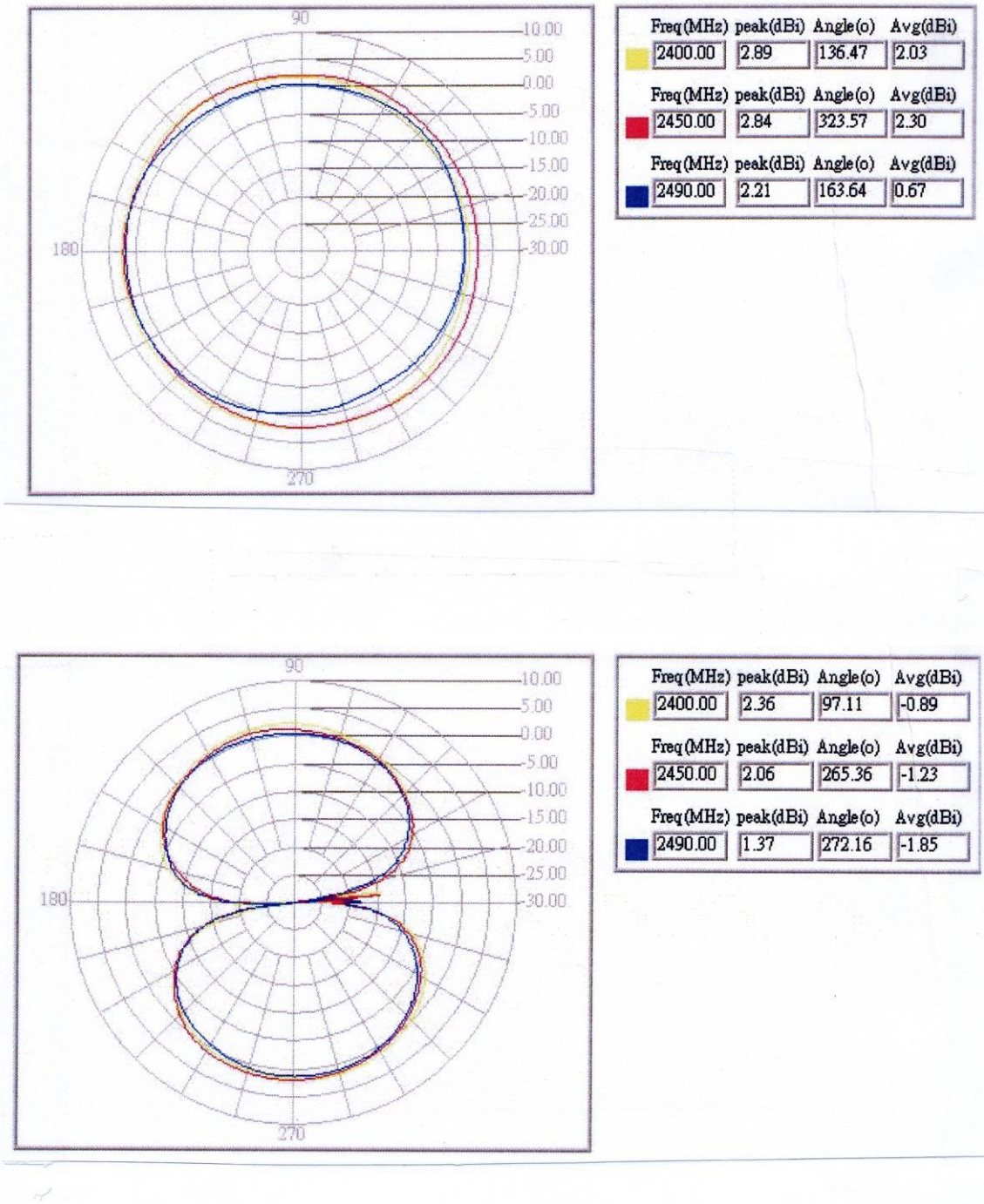

Figure 3 SBS Antenna Pattern

2.2.5 Power Supply

The SBS-W module operates from an external AC/DC power supply to provide a regulated DC voltage of 3.3 VDC at 2.18 Amps, and consumes a maximum power of 7.2 Watts.

2.2.6 Power-On Indicator

The SBS has a RED LED indicator that is illuminated when power is enabled.

2.2.7 Development/Programming Interface

The SBS is programmed using a 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.

The development / programming interface shall be designed to permit the following connections:

PC connect to WI-FI module only

PC connect to Bluetooth module only

Bluetooth module to WI-FI module, No connection to PC

2.3 Construction and Packaging

The Wireless Base Station is shaped similar to a rectangular with the following dimensions 87in length x5.9in width x 2.3in height. The Enclosure is molded for FRABS UL 94-V0 Plastic.

The SBS WI-FI- and Bluetooth modules, and related circuit elements are assembled on a single PCB, and enclosed in a rectangular box, with the following (nominal) dimensions:

Length	8.7 inches
Width	5.9 inches
Height	2.3 inches

2.4 Environment

The SiteWERX allowable environments for operating and storage shall be as follows:

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

3. Constraints

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
Dipole Antenna Datasheet
Matchport b/g Integration Guide
IEEE 802.11 b/g wireless standard

4.1 Acronyms/Abbreviations

AC	Alternating Current
BIST	Built In Self Test
CM	Cellular Module
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
EEPROM	Electrically Erasable Programmable Read Only Memory
GPS	Global Positioning System
I/O	Input /Output
mA	milliAmperes
PCB	Printed Circuit Board
SBS	SiteWERX Base Station
SLN	SiteWERX Location Node
SPS	SiteWERX Power Supply
UART	Universal Asynchronous Receiver/Transmitter
USB	Universal Serial Bus
VAC	Volts, Alternating Current
VDC	Volts, Direct Current