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915 Smart Tag

FCC ID:WONSA91004135

User Manual

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Distribution (Check all appropriate):

Precyse Only Project Team Only Customer and Supplier

Revision Record

Rev.	Effective Date	Description
1.0	30/10/13	915 Smart Tag user manual initial release

Reference documents

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Introduction

This document provides you with technical support information, and sources for additional product information.

Regulatory Information/disclaimers

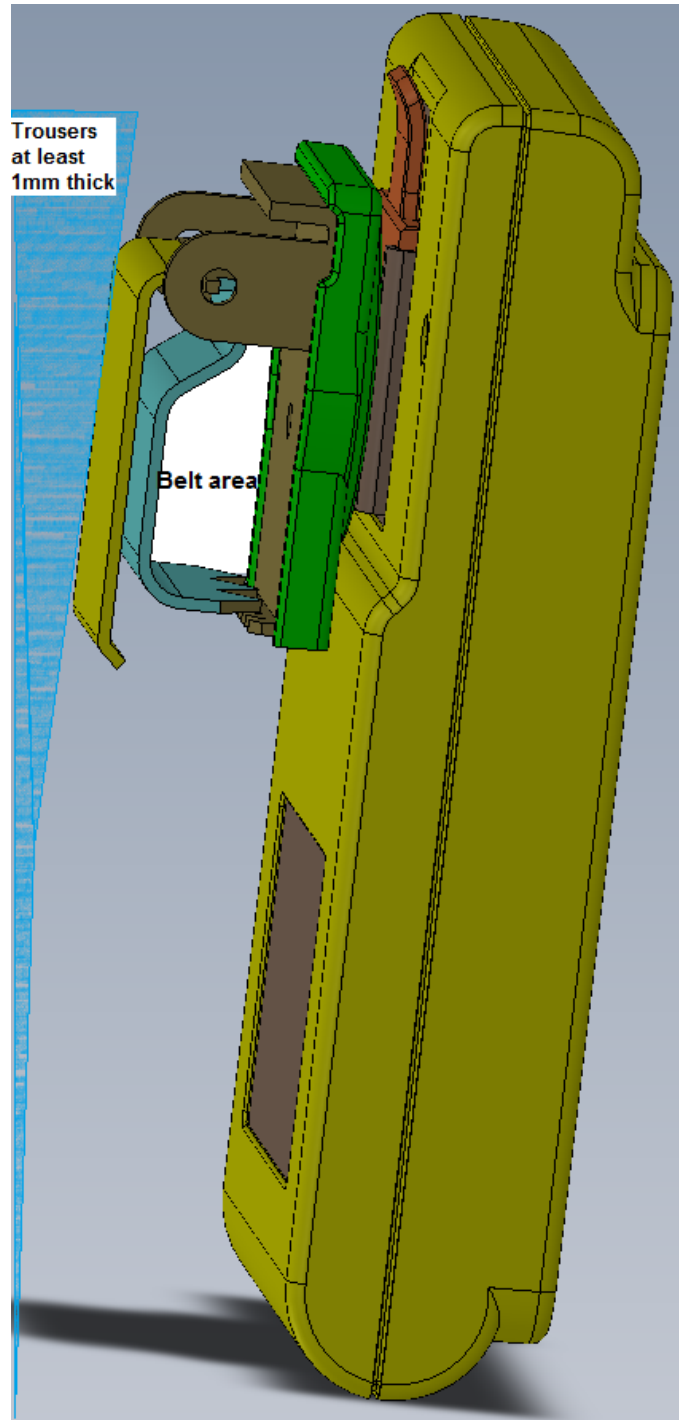
Installation and use of this Wireless Radio device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The Manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, of the substitution or attachment. Manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failing to comply with these guidelines.

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.

Instructions concerning human exposure to radio frequency electromagnetic fields:

To comply with FCC Section 1.1307 (b) (1) for FCC RF exposure, implement the following instructions:

1. Badge Tag should operate in worst case condition with 0.5% duty cycle@17dBm peak power, meaning $17\text{dBm} - 10 \cdot \log(0.5/100) = -6\text{dBm}$ i.e. 0.25mW which is the source based time averaged maximum conducted power of channel, including tune-up tolerance.
2. Badge Tag should be worn on the waist belt with crocodile clip as shown in picture below. Trousers should be at least 1mm thick i.e. test separation distance is >1mm.
3. The highest operating frequency 917.14GHz i.e. $\sqrt{f(\text{GHz})} = 0.958$
4. **SAR test exclusion** is based on the following calculation according to the KDB procedure: $[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] = [0.25/1] \cdot 0.958 = 0.25 \leq 3.0$



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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."

The FCC Wants You to Know

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:

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

FCC Warning

Modifications not expressly approved by the manufacturer could void the user authority to operate the equipment under FCC Rules.

Product description

915 Smart Tag (SA91/004135, SA91/004035, SA91/004032 and SA91/004132)

FCC ID: WONSA91004135

The SA Tag is used to track assets in real time. It is based on an RF transceiver and a microcontroller.

It uses the Precyse N3 proprietary protocol which provides a 2 way, half duplex communication with the base station.

The unit is powered by a 3 AA battery.

Technical Parameters

Models:

SA91/004135
SA91/004035
SA91/004032
SA91/004132

Performance:

Read range: up to 1km. (Within line of sight)

Write range: up to 1km. (Within line of sight)

Read rate: 250Kbps.

Write rate: 250Kbps.

Communication:

Frequency: 905-917.14MHz ISM within license free band

Modulation: 2-FSK

Channel bandwidth: 800KHz

Number of channels: 16

ERP: Up to 17dBm, digitally controlled

Communication protocol: N3.

Transmission: Event base and on demand

External interfaces:

1. 6 user buttons: 1-screen light, 2-find immediate location, 3-distress, 4-respond, 5-cancell message, 6-not used. The buttons are not used to increase transmission power in any way.
2. Buzzer
3. GPS receiver.

Internal sensors: Motion, temperature sensors.

Electrical:

Power supply: 3.6Vdc Battery Pack

Environmental:

Size: 57mm (L) x 17mm (W) x 105mm (H)
Operating temperature: -20°C to +75°C
Humidity: 90% non-condensing
Weight: 145gr. (5 ounces)

System test configuration

SAT

The unit tested was configured with all hardware options present. Since the unit, under its normal operation, does not transmit data periodically, for emissions measurements, the SAT was programmed with special test software to transmit packets continuously at 17dBm output power, duty cycle (67.7%) with power amplifier enabled **for FCC test requirement only**.

Normal operation duty cycle, assuming worst case, one event per second is less than 0.5% (5mSec transmit time per 1 second).

Tag wearing

SA91/004135 and SA91/004035 should be worn on the waist belt with crocodile clip as shown in picture below.

Theory of operation

The SAT method of communication is synchronized event based reporting, the SAT spends most of its time in low power sleep mode. Event could be GPS location, motion start and stop, PBC found and which one. When an event happens, the SAT sends a report to the base station. In order to avoid packet collisions and associated detection methods, the system uses a synchronous protocol, that is, An SAT can transmit data only after receiving a synchronization signal from the base station.

SA91/004135 915 ExBadge Smart Agent

Note1: for Hazardous locations.

Note2: yellow enclosure see picture below.



SA91/004035 915 Badge Smart Agent

Note3: same as SA91/004135 for non-hazardous locations.

Note4: white enclosure – same dimensions as SA91/004135.

SA91/004132 915 ExAsset Smart Agent

Note5: for Hazardous locations.

Note6: similar to SA91/004135 excluding display and human interface. See enclosure in picture below.

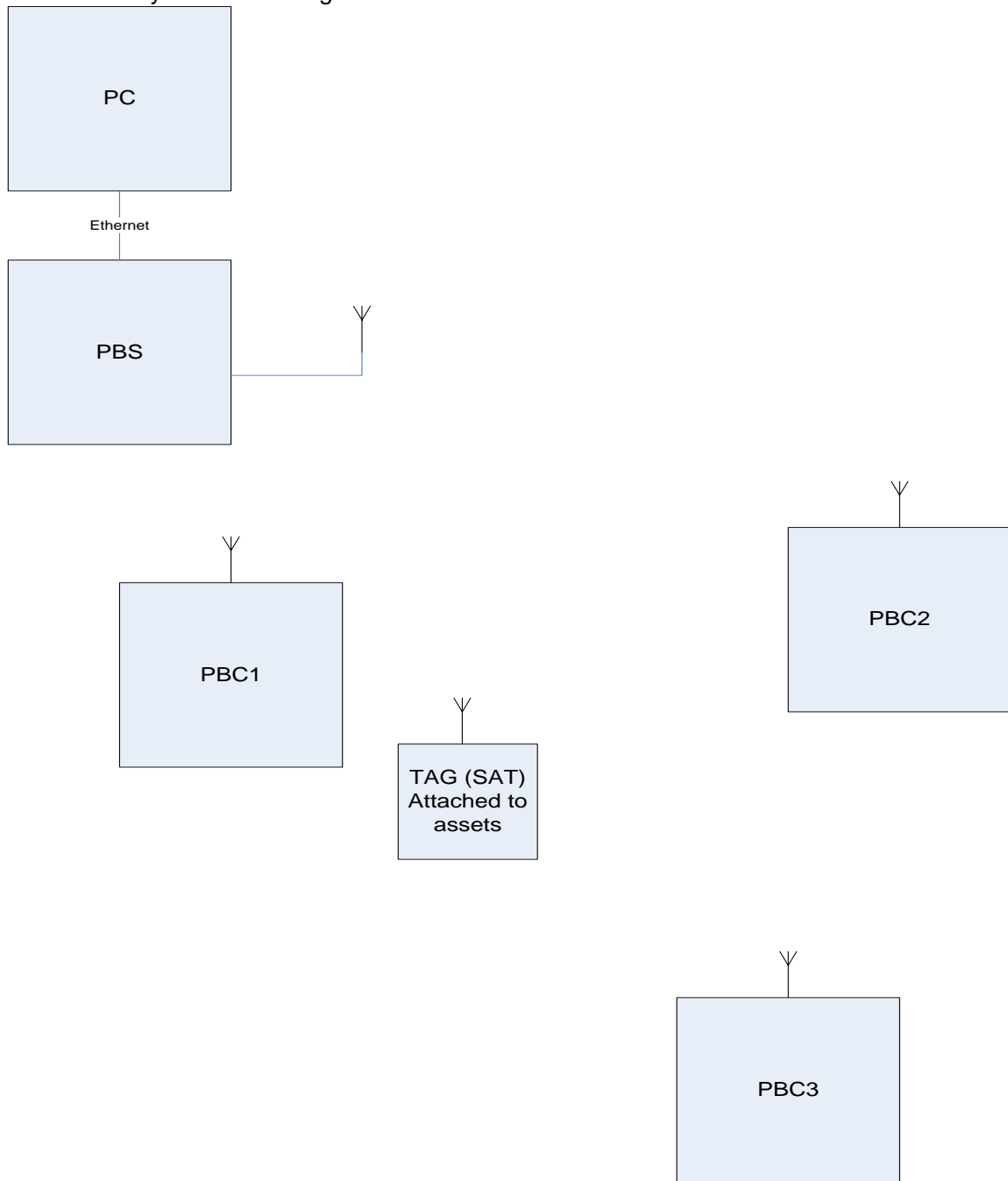


SA91/004032 915 Asset Smart Agent

Note7: Same as SA91/004132 for non-hazardous locations.

Note8: Same enclosure as SA91/004132.

iLocate system block diagram



Unit definitions:

Base station, referred to as PBS: A radio device that transmits data to and from the tag (SAT) to a personal computer (PC), also provides synchronization signal. The unit is powered by a DC power supply.

Beacon, referred to as PBC: A radio device that defines a location. Location detection can be realized through one or more PBCs. The unit is powered by a DC power supply.

Tag (SAT): A radio device that is used to track and monitor assets. It communicates with the PBS and can detect the PBC signals.