

---

Document No.:20121023-1  
Revision: 1.1

# Vehicle tag 915MHz

# User Manual

**Release Date:** 10/03/2013

**Prepared by:** Yossi Nurok

**Distribution (Check all appropriate):**

Precyse Only  Project Team Only  Customer and Supplier

C:\HardwareWS\Production\PD-915\Badge Tag\Vehicle\Documents\SA91004201 user manual.docx

## Revision Record

Rev.	Effective Date	Description
1.0	23/10/12	Vehicle tag user manual initial release
1.1	10/03/13	Frequency range corrected to 905-917.14MHz, Installation diagram updated

## Reference documents

#	Doc #	Description
1		

---

## TABLE OF CONTENTS

Section/Title	Page
Introduction .....	4
Regulatory Information/disclaimers.....	4
Product description .....	6
Vehicle AGPS tag: .....	6
Technical Parameters .....	6
Models: .....	6
Performance: .....	6
Communication: .....	6
Electrical: .....	6
Environmental: .....	7
Installation diagram.....	7
System test configuration.....	7
SAT .....	7
Theory of operation.....	8
iLocate system block diagram.....	9
Unit definitions: .....	10

---

## 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 1.307 (b) (1) for human exposure to radio frequency electromagnetic fields, implement the following instruction:

A distance of at least 20cm. between the equipment and all persons should be maintained during the operation of the equipment. The minimum distance will be determined after testing has been completed.

This document is confidential and proprietary. No part of this document may be reproduced, stored, or transmitted in any form or by any means without prior written permission from Precyse technologies Inc.

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

### *Vehicle AGPS tag:*

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 vehicle battery.

## Technical Parameters

### *Models:*

E3-HuTag-AGPS Part number: SA91/004201

### *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 within ISM license free band

**Modulation:** 2-FSK

**Channel bandwidth:** 812KHz

**EIRP:** Up to 18dBm, digitally controlled

**Communication protocol:** N3.

**Transmission:** Event base and on demand

**External interfaces:** 2 buzzers, GPS receiver.

**Internal sensors:** motion, accelerometer, temperature sensors.

### *Electrical:*

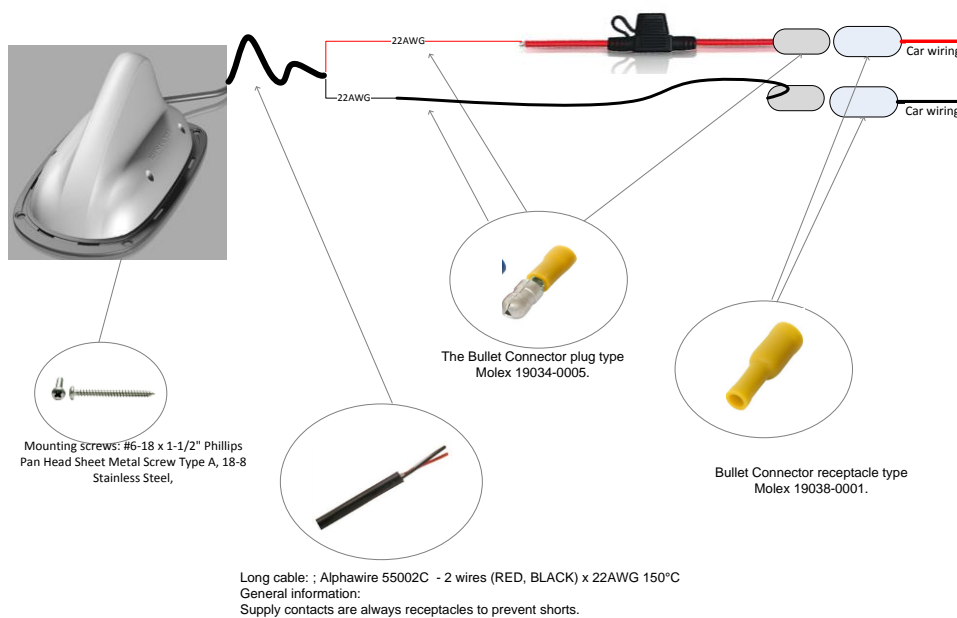
**Power supply:** 12/24Vdc car battery.

### Environmental:

**Size:** 100mm (L) x 70mm (W) x 20mm (H)  
**Operating temperature:** -20°C to +75°C  
**Humidity:** 90% non-condensing  
**Weight:** 100gr. (4 ounces)

## Installation diagram

The SA91/004201 should be connected to car battery through 1A fuse and mounted on external part of the vehicle e.g. hood or grille.



## 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 18dBm output power, duty cycle (9.6%) with power amplifier enabled.

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

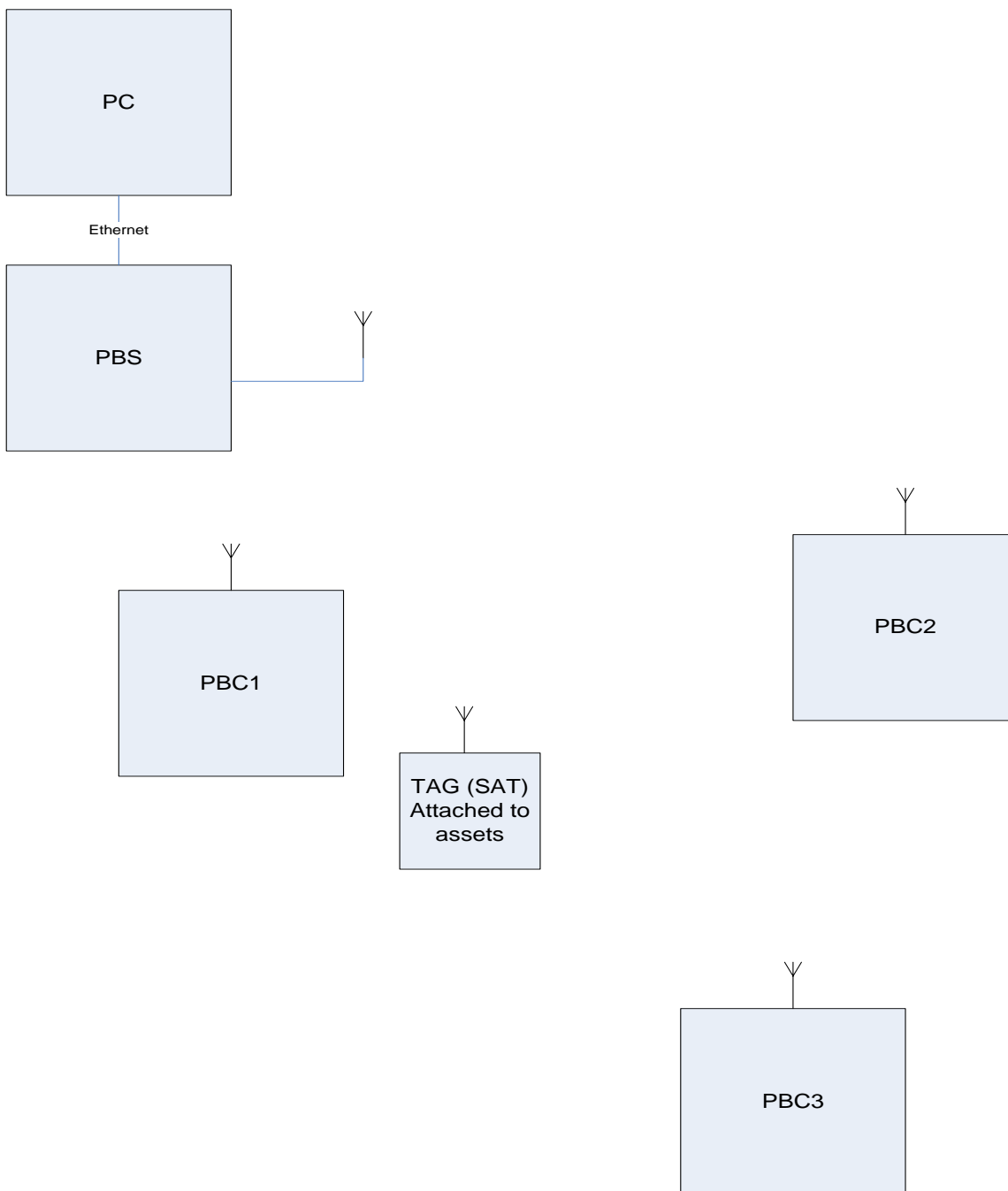
---

## Theory of operation

The SAT method of communication is synchronized event based reporting. Event could be GPS location, motion start and stop, PBC found and which one. Once it's connected to car battery the SAT spends most of its time in low power sleep mode. 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.



## 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.