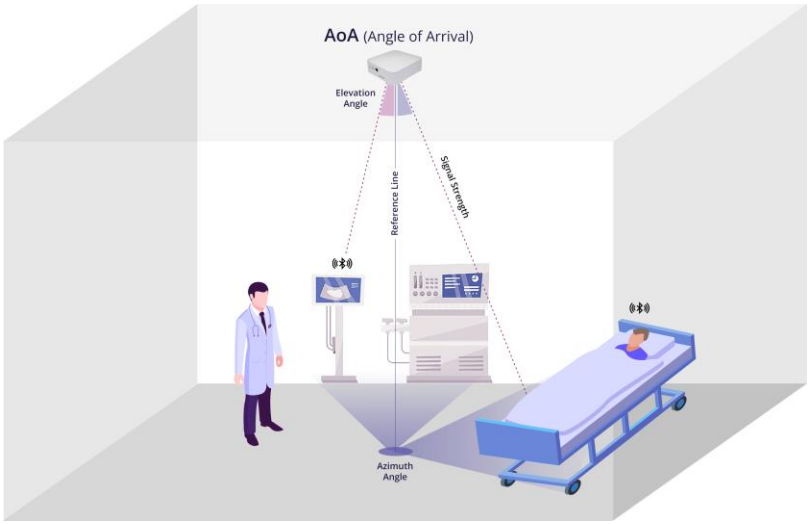
The kit is designed to provide accurate **location tracking** for **assets** and **personnel** using **BLE technology.**

VERSION 1.1

BLE RSSI RTLS Evaluation Kit Startup Guide



Introduction to BLE RSSI RTLS Evaluation Kit

Overview:

This guide will help you set up and utilize your BLE RSSI RTLS (Real-Time Location System) evaluation kit. The kit is designed to provide accurate location tracking for assets and personnel using BLE technology.

Components:

The BLE AoA Evaluation Kit includes:

- 2x Zenix LEN-2 BLE locator/Gateway
- 1x Zenix -2 BLE RSSI Locator/Gateway with climatic sensors
- 3x PINIX TOW-1 BLE AoA Asset tags
- 3x PINIX TOK-1 BLE Personnel tags
- Solix Standard RTLS & IoT Management Platform Subscription
- Power Adapters and POE cables
- Screws, bolts, and other mounting accessories

Understanding the BLE RSSI RTLS

Principles of Receive Signal Strength (RSSI):

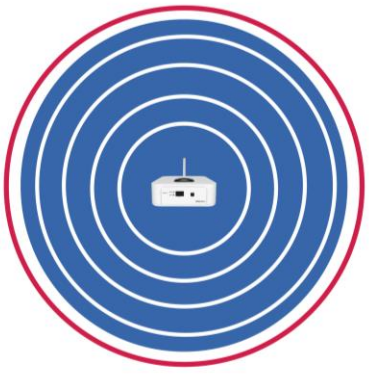
Basics of RSSI: Received Signal Strength Indicator (RSSI) technology estimates the distance between a BLE tag and a receiver (scanner/gateway) based on the strength of the received signal. Sentrax's Zenix LEN scanners continuously monitor the signal strength of BLE transmissions from tags, providing real-time location data.

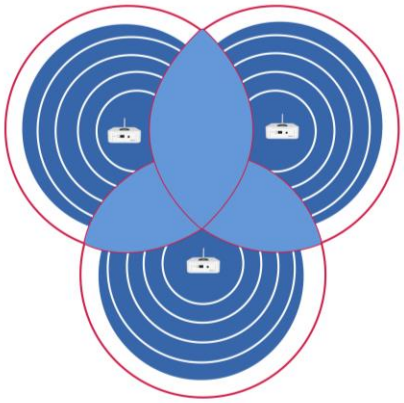
Signal Processing: As a BLE tag transmits signals, the receiver measures the power level of the received signal. Since signal strength diminishes with distance, an approximate range between the tag and receiver can be measured.

Multi-scanner Positioning (Trilateration): Deploying multiple RSSI scanners within a single zone enables trilateration, where the distances from multiple scanning points are used to compute the probable location of a tag. A minimum of three receivers helps determine a tag's position with reasonable accuracy.

Single Scanner vs. Multiple Scanner Deployment: Sentrax's RSSI-based RTLS offers a flexible gateway deployment strategy, allowing users to balance accuracy and infrastructure costs with advanced position calculation algorithms.

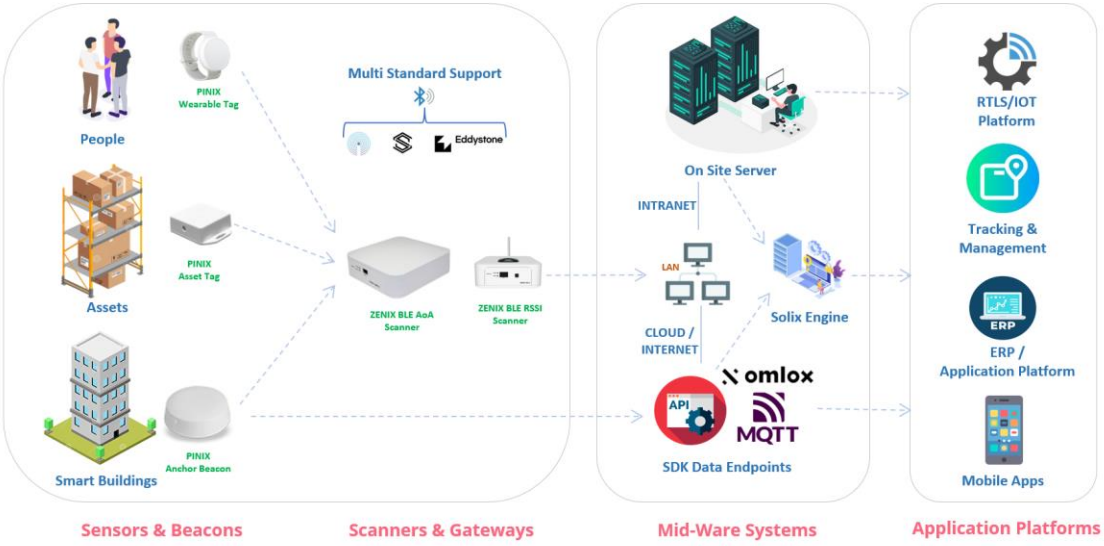
- Single Scanner Deployment: Deploying a single gateway within an RSSI zone enables basic presence detection. The system detects when a BLE tag is within range but does not provide precise location coordinates.
- Multiple Scanner Deployment: Deploying multiple scanners within a single RSSI zone enables trilateration, improving location accuracy. The system estimates the tag's position based on signal strength from multiple gateways. In this setup, the accuracy is typically **half the distance between the gateways** (e.g., if scanners are placed 10 meters apart, the location accuracy would be around 5 meters).





Reduced Interference: Advanced positioning algorithms mitigate the impact of environmental factors such as multipath reflections, signal fading, and other interference sources, enhancing system reliability and accuracy.

Sentrax's BLE RTLS Overview: Architecture and components:



Hardware Overview:

Zenix LEN-1 and LEN-1 BLE Locator/Gateways

Function: The gateway scans and receive BLE signals from the surrounding tags and estimate the location of the tags.

Zenix LEN-2

Zenix LEN-1

Zenix LEN-1: Indoor BLE RSSI based locator/gateway.

Zenix LEN-2: Indoor BLE RSSI based locator/gateway with environmental sensors.

Deployment: Typically installed at fixed locations on walls or ceilings within the coverage area.

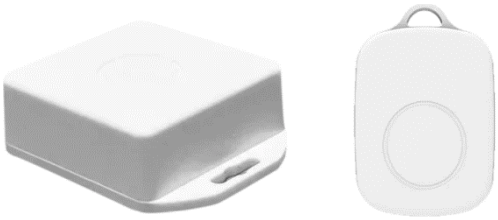
Connectivity: Sentrax's Zenix series offers multiple connectivity option for it's BLE locators/gateways including POE, Ethernet, Wi-Fi, with external 12VDC power supply (included).

Data Processing: The data is processed in the **ZENIX LEN gateways** and this data is forwarded to the central Solix Location Engine. Can be used on Solix RTLS and IoT management platform and/or can be integrated with partner's platform. Integration guide is available for details and extended support is provided for integration.

Pinix TOW-1 and TOK-1 Tags:

Function: These are small devices attached to an asset or can be carried by personnel. They periodically transmit BLE signals containing unique identifiers in SBeacon, iBeacon, and EddyStone (UID&TLM) data packets.

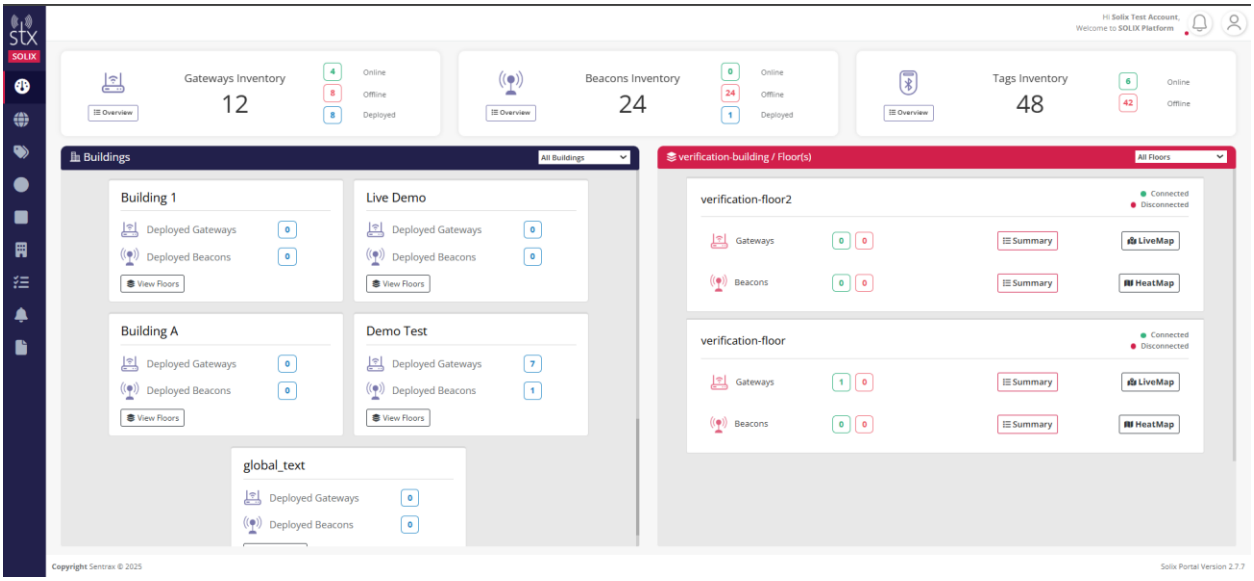
Types: There are **PINIX TOK-1 (personnel tags)** and **PINIX TOW-1 (asset tags)** included in the evaluation kit, each designed for specific use cases (e.g., personnel positioning vs. asset tracking).



These are equipped with configurable advertisement intervals, offers SBeacon (mandatory for AoA), iBeacon, and Eddystone (UID & TLM) advertisement protocols, with accelerometer, and higher batter life-time.

Solix RTLS Platform and Location Engine:

Solix Platform: The Solix platform acts as the central hub for the RTLS. It collects data from all the gateways, processes it, determines the precise locations of the tags, and display on the 2D map.



User Interface: Provides a user-friendly interface for monitoring and managing the tracked assets and personnel. It displays real-time location data on a map or floor plan. User can filter tags, assign icon, details to specific tags, and more.

Configuration and Alerts: Allows configuration of system parameters, such as tag identification, area definitions, alert settings, region alerts, and geo-fencing. Users can set up notifications for specific events (e.g., a tag leaving a designated area).

Analytics and Reporting: Offers tools for analyzing location data over time, generating reports, and gaining insights into asset utilization, personnel movement, and more.

Third-party integration: Sentrax offers APIs for integration of Solix with partner's management platforms with multiple options including REST API, omlox, MQTT, On-premise deployment, and iFrame embedding. For details on integration, a detailed Integration Guide is available on our partner portal or can be requested directly from our sales team. For more details on integration and support, please contact us at **support@sentrax.com** and our team will be happy to help you in integrating Solix with other platforms.

System workflow/Interaction:

Tag Signal Transmission: Tags periodically send out SBeacon, iBeacon, and Eddystone (UID&TLM) BLE signals with their unique identifiers. The transmission protocols can be selected and advertisement rates can be modified using Sentrax's Device Manager Application.

Data Aggregation and Processing: The RTLS positioning engine collects data from multiple gateways, applies trilateration to estimate tag positions where necessary, and continuously updates location information in real time.

Environmental Sensing: The Zenix LEN-2 and Pinix TOW-5 are equipped with climatic sensors and the real-time environmental data is uploaded to the platform.

Visualization and Alerts: Users can view the real-time locations of tags on the RTLS software's interface and receive alerts based on predefined criteria.

Getting started with the BLE AoA Evaluation Kit:

Installing mobile application and computer software:

For ZENIX LEN:

Advance IP Scanner and MQTT.fx is required. Following is the link for download:

Advance IP scanner: https://www.advanced-ip-scanner.com/

MQTT.fx : MQTT Fx Software

For PINIX Tags:

Download and install **Sentrax Device Manager application (SDM)** from Google Play store:

Play store link:
https://play.google.com/store/apps/details?id=com.sentrax.device_manager&hl=en_US

Hardware Setup:

ZENIX LEN Locators/Gateways:

Open the BLE AoA Evaluation kit box and verify the hardware, note the MAC address of each locator for future reference.

Power-up and Setup the hardware.

Refer to ***ZENIX LEN Quick Start Guide*** for step-by-step instructions on powering up the hardware.

Once the hardware is powered on, it's time to connect the hardware with the network.

Refer to ***ZENIX LEN Configuration Guide*** for step-by-step instructions on getting the IP address, configuring the MQTT broker.

Update the firmware if the new version is available (Chapter 4.2 of the Configuration Guide). Once everything is connected, you will be receiving the data on the MQTT broker.

PINIX Tags:

Power-up Test: Connect batteries and observe LED indicators.

Mode Transition: Press and hold the button for 5 seconds to switch between sleep and advertisement modes.

Install the **Sentrax' device manager** application from Google play store or Apple Appstore to get the tags configured and started.

Refer to ***PINIX TOK-1*** *User Guide* and ***PINIX TOW-1*** *user guide* for detailed step-by-step instructions on setting up and configuring the tags.

Installing the hardware:

The AoA locators/scanners are ceiling mounted and require certain height and wall clearance for optimal performance.

The scanners can be deployed on both single scanner configuration and multi-scanner configuration.

Please refer to the **ZENIX LEN Deployment Guide** for more details on setup and installation.

For any question or support, please contact our team at **support@sentrax.com** or **sales@sentrax.com**.

Setting-up Solix Platform:

Solix Platform comes in two packages (cloud and on-premise version) and both require different approaches. The evaluation kit comes with the subscription of Solix Standard Cloud platform.

Solix Cloud version:

Open the browser and go to **www.app.sentrax.com**.

Log-in using the credentials provided by Sentrax's team via email.

The devices (scanners and tags) are already registered on the on these accounts.

You can add buildings/floors, deploy devices, view the heat map, reports, manage devices, add custom notification & alerts, add regions & geo-fencing and more using the **Solix Platform**.

Please refer to ***Solix Quick Start Guide*** for step-by-step guidance on how to set up the Solix account and start the data visualization.

Solix On-Premise:

Please refer to the Solix On-Premise User Guide for setting it up. You can get in touch with us for more details on Solix on-prem version.

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