



# **Bluetooth<sup>®</sup> Real-Time Locating Library 3.3.2.0 GA**

## **Gecko SDK Suite 4.0**

### **March 9, 2022**

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Silicon Labs is a leading vendor in Bluetooth hardware and software technologies, used in products such as sports and fitness, consumer electronics, beacons, and smart home applications.

The Real-Time Locating (RTL) library contains features for Angle of Arrival estimation and spatial positioning. The software library comes with a C-programming language API for Windows (x86\_64) and Linux (ARM Cortex A, x86\_64) hosts.



#### **KEY FEATURES**

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- Support for additional hardware platforms and operating systems

The RTL Library is released with the Bluetooth SDK. These release notes cover the following version(s):

Real-Time Locating Library 3.3.2.0 in Bluetooth SDK 3.3.2.0 released on March 9, 2022  
Real-Time Locating Library 3.3.1.0 in Bluetooth SDK 3.3.1.0 released on January 26, 2022  
Real-Time Locating Library 3.3.0.0 in Bluetooth SDK 3.3.0.0 released on December 15, 2021

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## 1 New Items

### Added in release 3.3.0.0

#### **Support for multiple tags per locating library instance**

RTL library's locating library object now supports an unlimited number of tags (previously it supported only one - a new instance was required for each tag). A new API was added to support adding / removing tags, and separate API functions were added to provide measurements and calculate results for a particular tag. The existing API will still function unchanged, so this change does not require any modifications in the application, but it adds another way to design the architecture and to reduce the resource consumption.

#### **Support for obtaining angle calculation pseudospectrum**

Added functions for obtaining the pseudospectrum of the last calculated angle from the estimator. The pseudospectrum describes the probability of each angle in the search range being the true angle.

#### **Trilateration support**

Added trilateration support in the RTL library. Trilateration is a method for calculating the position based on the distances from multiple locators.

## 2 Improvements

### Changed in release 3.3.0.0

#### Improvements to supported platforms

The RTL library is now supported on Windows (x86\_64), Linux (x86\_64, ARM Cortex-A72, ARM Cortex-A53) and macOS (x86\_64) hosts. Officially supported and tested operating systems are Windows 10, Ubuntu 20.04 LTS, macOS Catalina 10.15.7 and Raspberry Pi OS (32-bit). Hardware testing coverage also includes Raspberry Pi 3, Raspberry Pi 4, AWS EC2 and Intel NUC.

In addition, the naming convention of the library files has changed and now the library files are named `libaox_static_<os>_<platform>.a` and all files are now found under `aox/lib/gcc/release` instead of platform-specific subdirectories.

#### Multiple tag support per locating library instance

New APIs were added to support adding multiple tracked tags in a single locating library instance to reduce memory consumption by sharing resources between the estimators. The following commands now allow configuring and using the library instance per tag:

- `sl_rtl_loc_add_tag`: Add a new tag into the locating library instance. The function outputs the tag ID.
- `sl_rtl_loc_remove_tag`: Remove the tag by tag ID from the instance.
- `sl_rtl_loc_set_target_parameter_tag`: Set target parameters by tag ID or for all tags in the instance.
- `sl_rtl_loc_clear_measurements_tag`: Clear the recent measurements by tag ID or for all tags in the instance.
- `sl_rtl_loc_set_locator_measurement_tag`: Set the measurements by locator and by tag ID.
- `sl_rtl_loc_process_tag`: Process the measurements by tag ID or for all tags in the instance.
- `sl_rtl_loc_get_result_tag`: Get the recent results by tag ID.
- `sl_rtl_loc_get_measurement_in_system_coordinates_tag`: Get the measurement converted into system coordinates by tag ID.
- `sl_rtl_loc_get_expected_direction_tag`: Get the expected direction of an asset by tag ID.
- `sl_rtl_loc_get_expected_deviation_tag`: Get the deviation values for expected direction by tag ID.
- `sl_rtl_loc_get_number_disabled_tag`: Get the number of disabled locators by tag ID.

### 3 Fixed Issues

#### Fixed in release 3.3.2.0

ID #	Description
813653	Fixed an issue where SL_RTL_AOX_ARRAY_TYPE_1x4_ULA would output incorrect angles in the wrong range when used with SL_RTL_AOX_MODE_REAL_TIME modes.
814653	Added switch pattern validation checks and improved documentation of sl_rtl_aox_update_switch_pattern in external pattern mode. The given pattern may not contain duplicate elements or elements exceeding the number of antennas.
815201	Fixed incorrect RTL lib antenna switch pattern for reduced antenna arrays (3x3 URA, 1x4 ULA) in <b>aoa_locator</b> and <b>positioning host</b> example applications.

#### Fixed in release 3.3.1.0

ID #	Description
765723	<p>RTL library's position calculation was incorrectly accepting zero standard deviation values for the angle or distance measurements (when calling sl_rtl_loc_set_locator_measurement for the angle or distance deviation fields), which would cause undefined behavior. Those are now ignored by the library.</p> <p>The standard deviation values are used, if available, for increased accuracy in position calculation and to better estimate the position, especially when the given measurements are less accurate.</p>

## 4 Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
375152	In heavy multipath conditions, the line-of-sight signal is not always detected correctly. In some cases this may mean large errors in both azimuth and elevation readings.	None

## 5 Deprecated Items

None

## 6 Removed Items

None



## 7 Using This Release

### 7.1 Installation and Use

For instructions on developing with the RTL library, see *AN1296: Application Development with Silicon Labs' RTL Library* and the API reference included with the documentation installed through Simplicity Studio in the Bluetooth SDK.

### 7.2 Support

Development Kit customers are eligible for training and technical support. Use the [Silicon Labs Bluetooth LE web page](#) to obtain information about all Silicon Labs Bluetooth products and services, and to sign up for product support.

Contact Silicon Laboratories support at <http://www.silabs.com/support> or through links on the Simplicity Studio Welcome page.

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