



# Bluetooth<sup>®</sup> LE SDK 6.0.0.0 GA

## Gecko SDK Suite 4.3

### June 7, 2023

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 core SDK is an advanced Bluetooth 5.4-compliant stack that provides all of the core functionality along with multiple API to simplify development. The core functionality offers both standalone mode allowing a developer to create and run their application directly on the SoC, or in NCP mode allowing for the use of an external host MCU.

These release notes cover SDK version(s):

6.0.0.0 GA released June 7, 2023

### Compatibility and Use Notices

For information about security updates and notices, see the Security chapter of the Gecko Platform Release notes installed with this SDK or on the TECH DOCS tab on <https://www.silabs.com/developers/bluetooth-low-energy>. Silicon Labs also strongly recommends that you subscribe to Security Advisories for up-to-date information. For instructions as well as notes on using Secure Vault features, or if you are new to the Silicon Labs Bluetooth SDK, see [Using This Release](#).

#### Compatible Compilers:

IAR Embedded Workbench for ARM (IAR-EWARM) version 9.20.4.

- Using wine to build with the IarBuild.exe command line utility or IAR Embedded Workbench GUI on macOS or Linux could result in incorrect files being used due to collisions in wine's hashing algorithm for generating short file names.
- Customers on macOS or Linux are advised not to build with IAR outside of Simplicity Studio. Customers who do should carefully verify that the correct files are being used.

GCC (The GNU Compiler Collection) version 10.3-2021.10, provided with Simplicity Studio.



#### KEY FEATURES

##### Bluetooth

- Bluetooth 5.4 support including Periodic Advertisements with Responses (PAwR) and Encrypted Advertisement Data (EAD) features
- Electronic Shelf Label (ESL) Service / Profile support - both Tag and Access Point (AP) roles
- Object Transfer Service / Profile support
- Periodic Advertisement Sync Transfer (PAST) support
- LE Privacy 1.2

##### Multiprotocol

- Zigbee/OpenThread Concurrent Multiprotocol SoC sample app
- CPC GPIO expander module
- Zigbeed enhancements

**Contents**

- 1 New Items .....2
  - 1.1 New Features.....2
  - 1.2 New APIs.....3
- 2 Improvements.....5
  - 2.1 Changed Items.....5
  - 2.2 Changed APIs.....5
- 3 Fixed Issues .....6
- 4 Known Issues in the Current Release .....7
- 5 Deprecated Items .....8
- 6 Removed Items .....9
- 7 Multiprotocol Gateway and RCP.....10
  - 7.1 New Items.....10
  - 7.2 Improvements .....10
  - 7.3 Fixed Issues.....10
  - 7.4 Known Issues in the Current Release .....11
  - 7.5 Deprecated Items.....11
  - 7.6 Removed Items.....11
- 8 Using This Release .....12
  - 8.1 Installation and Use.....12
  - 8.2 Security Information .....12
  - 8.3 Support.....13

## 1 New Items

### 1.1 New Features

#### Added in release 6.0.0.0

##### **Controller-based Privacy**

Controller-based privacy is now supported. The controller is able to perform address resolving for up to 8 devices. Include component 'bluetooth\_feature\_resolving\_list' to use controller address resolving. The host stack continues to perform address resolving for resolvable private addresses that were not resolved by the controller, or to support the use case where the controller address resolving feature is not used.

##### **Filter Accept List**

The Filter Accept List is enhanced by the support of address resolving in the controller. Use component 'bluetooth\_feature\_accept\_list' for the enhanced feature.

##### **Connection data length update**

The stack supports data length update on Bluetooth connections. The component 'bluetooth\_feature\_connection' has a new configuration SL\_BT\_CONFIG\_CONNECTION\_DATA\_LENGTH for setting default data length and run-time APIs are provided for using the feature.

##### **Resource usage report**

User applications can query the resource usage in the Bluetooth stack at run time with the 'bluetooth\_feature\_resource\_report' component.

##### **Transmission queue reports on Bluetooth connections**

The 'bluetooth\_feature\_resource\_report' component supports tracking and reporting the number of packets and bytes queued for transmission on a specific connection.

##### **Transmission events for GATT characteristic notifications**

The Bluetooth host stack now supports getting an event when the transmission of a GATT notification has completed on a connection. This functionality is provided by the 'bluetooth\_feature\_resource\_report' component when the application specifically enables connection TX queue reporting using the commands in that class.

##### **Use accurate Bluetooth address types in BGAPI**

It is possible now to select API semantics that use accurate Bluetooth address types with the 'bluetooth\_feature\_use\_accurate\_api\_address\_types' component. In the default Bluetooth stack configuration, most BGAPI commands and events use coarse address typing that only differentiates between public (value 0) and any random (value 1) address types. This component changes how the Bluetooth stack interprets and reports Bluetooth address types. When this component is included, Bluetooth commands and events that include an address type will systematically use the sl\_bt\_gap\_address\_type\_t enumeration to indicate the accurate type.

##### **Periodic Advertising with Responses (PAwR)**

The Bluetooth stack now supports advertising with and synchronizing to Periodic Advertising with Responses (PAwR). The Bluetooth stack has new components 'bluetooth\_feature\_pawr\_advertiser' for advertising with PAwR, 'bluetooth\_feature\_sync\_scanner' for scanning for synchronization, and 'bluetooth\_feature\_periodic\_sync' and 'bluetooth\_feature\_pawr\_sync' for managing the sync to periodic advertising trains of different types. The new BGAPI classes corresponding to these components supersede some functionality in the 'bluetooth\_feature\_sync' component. Deprecated functionality and the replacements are shown in the documentation of the affected BGAPI classes, commands, and events.

##### **PAwR-aware Connection Scheduling Algorithm**

The component 'bluetooth\_feature\_connection\_pawr\_scheduling' provides a connection scheduling algorithm that has been designed for use especially with applications that use several concurrent connections while advertising using PAwR. The algorithm tries to distribute the connections such a way that they are distracted as little as possible by the PAwR train.

## Support for Electronic Shelf Label (ESL) Service and Profile

The 'ESL Tag Core' software component implements the ESL tag role of the [Electronic Shelf Label Profile](#) and is fully compliant with the Bluetooth ESL specification.

The Access Point role is also implemented by the `bt_host_esl_ap` host sample app for NCP hosts, and is also fully compliant with the Bluetooth ESL specification.

## Support for Object Transfer Service (OTS) and Profile

Object Transfer Service and Profile is implemented by the 'Object Client' and 'Object Server' software components in accordance with the [Object Transfer Profile](#) specification. This enables transferring binary large objects via a BLE connections.

## Vendor HCI command for fetching connection parameters

Vendor HCI command `0xfc2a` is added for fetching the current parameters of a Bluetooth connection.

## 1.2 New APIs

### Added in release 6.0.0.0

**sl\_bt\_accept\_list\_add\_device\_by\_bonding command:** Add a device to the Filter Accept List based on its bonding handle.

**sl\_bt\_accept\_list\_add\_device\_by\_address command:** Add a device to the Filter Accept List based on its identity address.

**sl\_bt\_accept\_list\_remove\_device\_by\_bonding command:** Remove a device from the Filter Accept List based on its bonding handle.

**sl\_bt\_accept\_list\_remove\_device\_by\_address command:** Remove a device from the Filter Accept List based on its identity address.

**sl\_bt\_accept\_list\_remove\_all\_devices command:** Remove all devices from the Filter Accept List.

**sl\_bt\_resolving\_list\_add\_device\_by\_bonding command:** Add a device to the Resolving List based on its bonding handle.

**sl\_bt\_resolving\_list\_add\_device\_by\_address command:** Add a device to the Resolving List based on its identity address.

**sl\_bt\_resolving\_list\_remove\_device\_by\_bonding command:** Remove a device from the Resolving List based on its bonding handle.

**sl\_bt\_resolving\_list\_remove\_device\_by\_address command:** Remove a device from the Resolving List based on its identity address.

**sl\_bt\_resolving\_list\_remove\_all\_devices command:** Remove all devices from the Resolving List.

**sl\_bt\_connection\_set\_default\_data\_length command:** Set the default preferred maximum TX payload length for new connections.

**sl\_bt\_connection\_set\_data\_length command:** Update the maximum TX payload length and maximum packet TX time of a Bluetooth connection.

**sl\_bt\_evt\_connection\_data\_length event:** Report a change to the maximum payload length or TX time in either direction of a connection.

**sl\_bt\_connection\_forcefully\_close command:** Forcefully close a Bluetooth connection without performing the ACL Termination procedure.

**sl\_bt\_resource\_get\_status command:** Get the present memory buffer usage status.

**sl\_bt\_resource\_set\_report\_threshold command:** Set low and high thresholds of memory buffer usage reports.

**sl\_bt\_resource\_enable\_connection\_tx\_report command:** Enable tracking and reporting data packet TX status of future new connections.

**sl\_bt\_resource\_get\_connection\_tx\_status command:** Get the data packet TX status of a connection.

**sl\_bt\_resource\_disable\_connection\_tx\_report command:** Disable tracking and reporting data packet TX status of future new connections.

**sl\_bt\_evt\_resource\_status event:** Indicates that the memory buffer usage has crossed a threshold.

**sl\_bt\_evt\_gatt\_server\_notification\_tx\_completed event:** Indicates that one or more GATT notifications have been transmitted.

- sl\_bt\_scanner\_set\_parameters\_and\_filter command:** Set scan parameters and the scanning filter policy for subsequent scanning operations.
- sl\_bt\_pawr\_advertiser\_start command:** Start PAwR advertising on an advertising set.
- sl\_bt\_pawr\_advertiser\_set\_subevent\_data command:** Set data to be sent in the subevent of an active PAwR train.
- sl\_bt\_pawr\_advertiser\_create\_connection command:** Initiate a connection request to a device that is synchronized to the active PAwR train.
- sl\_bt\_pawr\_advertiser\_stop command:** Stop PAwR advertising on an advertising set.
- sl\_bt\_evt\_pawr\_advertiser\_subevent\_data\_request event:** Triggered when the Bluetooth stack is ready to accept data for subevents of the PAwR train.
- sl\_bt\_evt\_pawr\_advertiser\_subevent\_tx\_failed event:** Triggered if subevent data was successfully set but the attempt to transmit the subevent data has failed.
- sl\_bt\_evt\_pawr\_advertiser\_response\_report event:** Reports the status and data of a used response slot of an active PAwR train.
- sl\_bt\_sync\_scanner\_set\_sync\_parameters command:** Configure synchronization parameters for synchronizing to periodic advertising trains.
- sl\_bt\_sync\_scanner\_open command:** Start establishing synchronization with the specified periodic advertiser in parallel with other advertisers given in previous invocations of this command.
- sl\_bt\_sync\_update\_sync\_parameters command:** Update synchronization parameters for a periodic sync that was already established.
- sl\_bt\_evt\_periodic\_sync\_opened event:** Triggered when synchronization is established to a periodic advertising train that does not have subevents or response slots.
- sl\_bt\_evt\_periodic\_sync\_transfer\_received event:** Triggered when synchronization transfer is received for a periodic advertising train that does not have subevents or response slots.
- sl\_bt\_evt\_periodic\_sync\_report event:** Triggered when data for a periodic advertising train that does not have subevents or response slots is received and accepted by the reporting mode currently set to the train.
- sl\_bt\_evt\_pawr\_sync\_opened event:** Triggered after synchronization is established to a PAwR train.
- sl\_bt\_evt\_pawr\_sync\_transfer\_received event:** Triggered after synchronization transfer is received for a PAwR train.
- sl\_bt\_pawr\_sync\_set\_sync\_subevents command:** Specify the subevents that this device will synchronize to on the specified PAwR train.
- sl\_bt\_evt\_pawr\_sync\_subevent\_report event:** Triggered when subevent data for PAwR train is received and accepted by the reporting mode currently set to the train.
- sl\_bt\_pawr\_sync\_set\_response\_data command:** Set the data to be sent in the specified response slot of a subevent of an active PAwR train.
- sl\_bt\_sync\_update\_sync\_parameters command:** Update synchronization parameters for a periodic sync that was already established.
- sl\_bt\_gatt\_discover\_characteristic\_descriptors command:** Discover all descriptors of a GATT characteristic in a remote GATT database.
- New option in **sl\_bt\_sm\_configure command:** Support the new option of rejecting a pairing when the remote device uses debug keys.

## 2 Improvements

### 2.1 Changed Items

#### Changed in release 6.0.0.0

##### **Amazon FreeRTOS BLE HAL component**

The Amazon FreeRTOS BLE HAL component `iot_ble` has been updated to use new BGAPI classes for scanning and advertising. If a BLE HAL application uses scanning, the application must add `bluetooth_feature_legacy_scanner` to the application project. If a BLE HAL application uses advertising, the application must add `bluetooth_feature_legacy_advertiser` to the application project.

##### **BGAPI command calls prevented from interrupt handler mode**

The stack now checks if a BGAPI command is called in interrupt handler mode, and returns error `SL_STATUS_IRQ` if so.

### 2.2 Changed APIs

**sl\_bt\_evt\_connection\_parameters event:** No longer used for communicating the TX data length change on the connection. Data length update comes from new event `sl_bt_evt_connection_data_length`.

**sl\_bt\_evt\_l2cap\_le\_channel\_open\_request event:** New parameter `remote_cid` is appended to the event parameter list for specifying the corresponding channel identifiers of the peer device.

**sl\_bt\_evt\_l2cap\_le\_channel\_open\_response event:** New parameter `remote_cid` is appended to the event parameter list for specifying the corresponding channel identifiers of the peer device.

**sl\_bt\_sm\_configure command:** Option "Allow connections only from bonded devices" is not supported when the application includes the `bluetooth_feature_external_bonding_database` feature.

**Connection handle returned from sl\_bt\_connection\_open command and sl\_bt\_evt\_connection\_opened event:** The stack now uses a handle value assignment schematic such that a newly assigned handle contains an additional sequence number. This change is to solve possible handle collisions in race conditions when connections are opened and closed very frequently.

### 2.3 Intended Behavior

When configuring the HFXO frequency in `SL_DEVICE_INIT_HFXO_FREQ`, make sure to set the `SL_DEVICE_INIT_DPLL_FREQ` to twice the HFXO frequency in `sl_device_init_dpll_config.h` for proper function of Bluetooth.

### 3 Fixed Issues

#### Fixed in release 6.0.0.0

ID #	Description
731981	Document UG434 is updated to only describe the priorities of interrupts used by the Link Layer and radio. Other interrupts, e.g., the USART interrupt, that are not used by the Bluetooth stack are no longer listed. Check the priority settings in the corresponding component to determine whether it uses the default priorities or has its own setting.
1074048	Fix an issue in Apploder that the address and address type are sent in wrong order in the advertising data packet. This issue results in the address type becoming part of the address and the most significant byte of the address becoming the address type.
1084247	Fix a memory leak if a connection update is received from the remote device at the same time as the connection is being closed by the local device.
1099142	Fix a pairing failure when the remote device address is a resolvable private address that has been resolved in link layer.
1104191	Fix a peripheral connection performance issue with simultaneous scanning.
1105786 1132177	Fix the extended connection backoff procedure behavior. Now, when the Link Layer fails multiple times to receive a AUX_CONNECT_RSP after a AUX_CONNECT_REQ is sent, an increasingly random number of connectable extended advertisements are skipped before attempting to connect again.
1118901	Update the documentation of the sl_bt_evt_connection_tx_power event to explicitly list the situations in which this event may get triggered.
1124748	Fix a possible MIC failure case when encrypting a connection with the bluetooth_feature_external_bonding_database component.
1124749	Fix an issue that could cause the Bluetooth stack to enter a live-lock situation where no progress is made if buffer resources are exhausted when the stack is generating critical events that require a retry in out-of-memory situations.
1124749	Update the documentation of the sl_bt_external_signal API that, if the Platform Core Interrupt API has been configured to use the CORE_ATOMIC_METHOD_BASEPRI as the implementation method of atomic sections, this function must not be called from an interrupt handler with a priority higher than CORE_ATOMIC_BASE_PRIORITY_LEVEL.
1132204	Improve that ATT PDU validation in the GATT server for the case that it receives more data than defined in the data length field of the L2CAP packet. The GATT server will discard such invalid packet.
1132430	Clarify that the transmission specified in the sl_bt_test_dtm_tx_v4 command is restricted by the global TX power setting that could be set using the sl_bt_system_set_tx_power command.
1135759	The sl_bt_system_linklayer_configure command now returns error codes properly. Previously it returned SL_STATUS_OK always even when the low level returns an error.
1135862	Improve the ATT response length validation to prevent the stack from being corrupted if the ATT response contains a too large invalid length value.
1135899	Fix an issue that the GATT client operation under command sl_bt_gatt_discover_primary_services goes into an infinite loop until the GATT operation timeout occurs if the end group handle in the response from GATT server is 0.
1137820	Fix an issue that the GATT client continues reading the value infinitely until the GATT operation timeout occurs if the GATT server always claims that it has more data to read for an attribute. This has been fixed such that the GATT client will stop the operation when the data offset is bigger than the attribute's maximum length.
1142135	Fix a memory leak when debug keys (set with command with sl_bt_sm_set_debug_mode) are used for pairing. The issue does not exist when pairing with normal keys.
1143357	Fix an issue of possible duplicate handle assignment in the stack in race conditions when a new connection is opened in the time period between the stack generating a sl_bt_evt_connection_opened event and the user application receiving the event for a disconnected connection.
1143531	Fix an issue that the EDIV and random values were always set to all zero, potentially causing encryption to fail when reconnecting to a peripheral that has been paired with legacy pairing.
1143589	Improve the channel identifier validation in L2CAP COC disconnection requests and responses to comply with the specification.
1145778	Fix an issue in the stack that the LTK key is stored incorrectly in RAM after doing the bonding. This issue may cause encryption failure if the key is refreshed later on that same connection. This issue does not affect persistent bonding data.

## 4 Known Issues in the Current Release

Issues in bold were added since the previous release. If you have missed a release, recent release notes are available on <https://www.silabs.com/developers/bluetooth-low-energy> in the Tech Docs tab.

ID #	Description	Workaround
361592	The sync_data event does not report TX power.	None
368403	If setting CTE interval to 1, a CTE request should be sent in every connection interval. But it is sent only in every second connection interval.	None
641122	The Bluetooth stack component does not provide a configuration for RF antenna path.	This is an issue specifically for BGM210P. One workaround is to manually update the configuration in sl_bluetooth_config.h in text edit mode. If the OTA with Apploader is used, include the bluetooth_feature_ota_config component in application project. Call command sl_bt_ota_set_rf_path() to set the RF path for OTA mode.
650079	LE 2M PHY on EFR32[B M]G12 and EFR32[B M]G13 doesn't work with smartphones using the Mediatek Helio chip due to an interoperability issue.	No workaround exists. For application development and testing, the disconnection can be avoided by disabling 2M PHY with sl_bt_connection_set_preferred_phy() or sl_bt_connection_set_default_preferred_phy().
682198	The Bluetooth stack has an interoperability issue on the 2M PHY with a Windows PC.	No workaround exists. For application development and testing, the disconnection can be avoided by disabling 2M PHY with sl_bt_connection_set_preferred_phy() or sl_bt_connection_set_default_preferred_phy().
730692	4-7% packet error rate is observed on EFR32M BG13 devices when RSSI is between -25 and -10 dBm. The PER is nominal (as per the datasheet) both above and below this range.	None
756253	The RSSI value on a Bluetooth connection returned by the Bluetooth API is incorrect on EFR32M B1, EFR32M B12, EFR32M B13, and EFR32M B21 devices. On EFR32M B21 devices. It is about 8~10 dBm higher than the actual value, according to a measurement.	Install the "RAIL Utility, RSSI" component in the application project. This component provides a default RSSI offset for the chip that is applied at the RAIL level and can help to achieve more accurate RSSI measurements.
845506	When the Bluetooth_feature_afh component for AFH is included, the feature initialization always enables AFH.	To include the component but not to enable AFH at device boot, change the parameter value from 1 to 0 in the function call of sl_btctrl_init_afh() in sl_bt_stack_init.c.
1031031	Changing the configuration in the bt_aoa_host_locator application results in the application crashing.	None
1152034	<b>Using "mode auto" on bt_host_esl_ap (ESL Access point script) can lead to an infinite connection-forming loop in the following scenario:</b>  <b>ESL tag will sleep after 1 hour of advertising. The Access point (AP) script is started before the ESL tag starts to sleep (for example 59 mins after the ESL tag is started). AP will scan the tag's advertisement and will connect to it after a while. If the connection forming is initiated when the ESL tag is already sleeping the AP will never give up the connection trials.</b>	<b>Stop mode auto, stop scanning, start mode auto again.</b>



## 5 Deprecated Items

### Deprecated in release 6.0.0.0

Component `bluetooth_feature_whitelisting`

Command `sl_bt_gap_enable_whitelisting`

Command `sl_bt_sync_set_parameters`

Command `sl_bt_sync_open`

Command `sl_bt_evt_sync_opened`

Command `sl_bt_evt_sync_transfer`

Command `sl_bt_evt_sync_data`

Command `sl_bt_sm_add_to_whitelist`

The `txsize` field in command `sl_bt_evt_connection_parameters`

## 6 Removed Items

### Removed from release 6.0.0.0

Component bluetooth\_feature\_dfu

Component bluetooth\_apploder\_migration\_util

Component bluetooth\_feature\_default

## 7 Multiprotocol Gateway and RCP

### 7.1 New Items

#### **Added in release 6.0.0.0**

Added a new application `z3-light_ot-ftd_soc` that demonstrates Zigbee and OpenThread Concurrent Multiprotocol functionality. It features a router on the Zigbee side and a Full Thread Device (FTD) on the OpenThread side. See the project description or [app/framework/scenarios/z3/z3-light\\_ot-ftd\\_soc/readme.html](app/framework/scenarios/z3/z3-light_ot-ftd_soc/readme.html) for details.

First GA-quality release of CPC GPIO Expander module. The Co-Processor Communication (CPC) General Purpose Input/Output (GPIO) Expander is a software component designed to enable a Host device to utilize a Secondary device's GPIOs as if they were its own. With the CPC GPIO Expander, the Host device can seamlessly integrate with the Secondary device and make use of its GPIO capabilities. See <https://github.com/SiliconLabs/cpc-gpio-expander/README.md> for documentation.

Added antenna diversity and coex EZSP command support to Zigbeed.

Added better assert reporting to Zigbeed.

Added `bt_host_empty` application (option: `-B` for the `run.sh` script) to the multiprotocol docker container.

Zigbeed now includes an implementation of `emberGetRestoredEui64()` which loads the `CREATOR_STACK_RESTORED_EUI64` token from the `host_token.nvm` file.

The multiprotocol container now sets the size of syslog to 100 MB by default. Users are able to change the size by modifying the `/etc/logrotate.d/rsyslog` and `/etc/rsyslog.d/50-default.conf` files and restarting the rsyslog service inside the container.

### 7.2 Improvements

#### **Changed in release 6.0.0.0**

Reduced CPC Tx and Rx queue sizes to fit the DMP NCP on the MG13 family.

Configured options on the multiprotocol RCP projects to provide ~3.3k in RAM savings, particularly for the MG1 part. This was accomplished by

- Reducing
  - The number of user CPC endpoints to 0
  - Tx CPC queue size to 15 from 20
  - Rx buffer count to 15
- Disabling OpenThread RTT logs

For further savings, customers can look into reducing the Tx and Rx queue sizes further. Note that the downside to this change would be a reduction in message throughput due to added retries. Also, customers can look into reducing the NVM cache size based on need. As a last resort, customers may also choose to disable CPC security on both the RCP and the host. We do not recommend the last option.

Changed `zigbee_ble_event_handler` to print scan responses from legacy advertisements in the `DMPLight(Sed)` app.

The `rcp-xxx-802154` apps now by default support 192  $\mu$ sec turnaround time for non-enhanced acks while still using 256  $\mu$ sec turnaround time for enhanced acks required by CSL.

### 7.3 Fixed Issues

#### **Fixed in release 6.0.0.0**

ID #	Description
1078323	Resolved issue where Z3GatewayCPC asserts when there is a communication failure with the NCP during address table initialization. We will now try to reconnect to the NCP upon failure.
1080517	Z3GatewayCPC now automatically handles a reset of the NCP (CPC secondary).

ID #	Description
1117789	Fixed an issue where modifying OPENTHREAD_CONFIG_PLATFORM_RADIO_SPINEL_RX_FRAME_BUFFER_SIZE caused a linker error when building Zigbeed.
1118077	In the CMP RCP, Spinel messages were being dropped under heavy traffic load due to CPC not keeping up with the incoming packets. Fixed this by bundling all Spinel messages ready to be sent over CPC into one payload on the RCP and unbundling them on the host. This dramatically improves the efficiency of CPC so that it can keep up with the incoming radio traffic.
1129821	Fixed null pointer dereference in Zigbeed in an out-of-buffer scenario while receiving packets.
1139990	Fixed an assert in the OpenThread Spinel code that could be triggered when joining many Zigbee devices simultaneously.
1144268	Fixed an issue where excessive radio traffic can cause the Zigbee-BLE NCP to get into a state where it continually executes the NCP and CPC initialization.
1147517	Fixed an issue with Z3GatewayCPC on startup that could cause the reset handling of the secondary to not work correctly.

## 7.4 Known Issues in the Current Release

Issues in bold were added since the previous release. If you have missed a release, recent release notes are available on <https://www.silabs.com/developers/gecko-software-development-kit>.

ID #	Description	Workaround
811732	Custom token support is not available when using Zigbeed.	Support is planned in a future release.
937562	Bluetoothctl 'advertise on' command fails with rcp-uart-802154-blehci app on Raspberry Pi OS 11.	Use btmgmt app instead of bluetoothctl.
1074205	The CMP RCP does not support two networks on the same PAN id.	Use different PAN ids for each network. Support is planned in a future release.
<b>1122723</b>	<b>In a busy environment the CLI can become unresponsive in the z3-light_ot-ftd_soc app.</b>	<b>This app is released as experimental quality and the issue will be fixed in a future release.</b>
<b>1124140</b>	<b>z3-light_ot-ftd_soc sample app is not able to form the Zigbee network if the OT network is up already.</b>	<b>Start the Zigbee network first and the OT network after.</b>
<b>1129032</b>	<b>Experimental concurrent listening feature on xG24 devices is disabled in this release.</b>	<b>Support is planned in a future release.</b>
<b>1143857</b>	<b>Antenna Diversity is not available on the CMP RCP for xG21 and xG24 parts, since the antenna diversity hardware is used for concurrent listening.</b>	<b>Intended behavior.</b>

## 7.5 Deprecated Items

None

## 7.6 Removed Items

None

## 8 Using This Release

This release contains the following

- Silicon Labs Bluetooth stack library
- Bluetooth sample applications

For more information about the Bluetooth SDK see <https://docs.silabs.com/bluetooth/latest/>. If you are new to Bluetooth see [UG103.14: Bluetooth LE Fundamentals](#).

### 8.1 Installation and Use

The Bluetooth SDK is provided as part of the Gecko SDK (GSDK), the suite of Silicon Labs SDKs. To quickly get started with the GSDK, install [Simplicity Studio 5](#), which will set up your development environment and walk you through GSDK installation. Simplicity Studio 5 includes everything needed for IoT product development with Silicon Labs devices, including a resource and project launcher, software configuration tools, full IDE with GNU toolchain, and analysis tools. Installation instructions are provided in the online [Simplicity Studio 5 User's Guide](#).

Alternatively, Gecko SDK may be installed manually by downloading or cloning the latest from GitHub. See [https://github.com/SiliconLabs/gecko\\_sdk](https://github.com/SiliconLabs/gecko_sdk) for more information.

Simplicity Studio installs the GSDK by default in:

- (Windows): C:\Users\<<NAME>\SimplicityStudio\SDKs\gecko\_sdk
- (MacOS): /Users/<NAME>/SimplicityStudio/SDKs/gecko\_sdk

Documentation specific to the SDK version is installed with the SDK. Additional information can often be found in the [knowledge base articles \(KBAs\)](#). API references and other information about this and earlier releases is available on <https://docs.silabs.com/>.

### 8.2 Security Information

#### Secure Vault Integration

When deployed to Secure Vault High devices, sensitive keys such as the Long Term Key (LTK) are protected using the Secure Vault Key Management functionality. The table below shows the protected keys and their storage protection characteristics.

Wrapped Key	Exportable / Non-Exportable	Notes
Remote Long Term Key (LTK)	Non-Exportable	
Local Long Term Key (legacy only)	Non-Exportable	
Remote Identity Resolving Key (IRK)	Exportable	Must be Exportable for future compatibility reasons
Local Identity Resolving Key	Exportable	Must be Exportable because the key is shared with other devices.

Wrapped keys that are marked as “Non-Exportable” can be used but cannot be viewed or shared at runtime.

Wrapped keys that are marked as “Exportable” can be used or shared at runtime but remain encrypted while stored in flash.

For more information on Secure Vault Key Management functionality, see [AN1271: Secure Key Storage](#).

## Security Advisories

To subscribe to Security Advisories, log in to the Silicon Labs customer portal, then select **Account Home**. Click **HOME** to go to the portal home page and then click the **Manage Notifications** tile. Make sure that 'Software/Security Advisory Notices & Product Change Notices (PCNs)' is checked, and that you are subscribed at minimum for your platform and protocol. Click **Save** to save any changes.

**SILICON LABS** Search Within the Support Portal for Cases, etc... SEARCH CATHERIN...

HOME CASES SOFTWARE RELEASES

### Update Preference

WHAT EMAILS WOULD YOU LIKE TO RECEIVE?

**Newsletters**

- Community Monthly Newsletter
- Sales Newsletter
- Micrium Newsletter

**Product Specific Notifications**

- Product Information and Newsletter
- Software/Security Advisory Notices & Product Change Notices (PCNs)
- Technical Document Updates (Release Notes, Data Sheets, etc.)

SELECT THE PRODUCTS TO RECEIVE UPDATES FOR

Select/Unselect All

<input type="checkbox"/> Audio and Radio	<input type="checkbox"/> Power over Ethernet
<input type="checkbox"/> Interface	<input type="checkbox"/> Sensors
<input type="checkbox"/> Isolation	<input type="checkbox"/> TV and Video
<input type="checkbox"/> Modems and DAAs	<input type="checkbox"/> Voice
<input type="checkbox"/> Microcontrollers	<input type="checkbox"/> Wireless
<input type="checkbox"/> 8-bit MCUs <input checked="" type="checkbox"/> 32-bit MCUs	<input type="checkbox"/> Bluetooth Classic <input type="checkbox"/> Bluetooth Low Energy <input checked="" type="checkbox"/> Proprietary
<input type="checkbox"/> Timing	<input type="checkbox"/> Wi-Fi
<input type="checkbox"/> Clocks	<input type="checkbox"/> ZigBee and Thread
<input type="checkbox"/> Buffers	<input type="checkbox"/> Z-Wave
<input type="checkbox"/> Oscillators	
<input type="checkbox"/> CDR and PHY	

## 8.3 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.

You can contact Silicon Laboratories support at <http://www.silabs.com/support>.

# Simplicity Studio

One-click access to MCU and wireless tools, documentation, software, source code libraries & more. Available for Windows, Mac and Linux!



**IoT Portfolio**  
[www.silabs.com/IoT](http://www.silabs.com/IoT)



**SW/HW**  
[www.silabs.com/simplicity](http://www.silabs.com/simplicity)



**Quality**  
[www.silabs.com/quality](http://www.silabs.com/quality)



**Support & Community**  
[www.silabs.com/community](http://www.silabs.com/community)

## Disclaimer

Silicon Labs intends to provide customers with the latest, accurate, and in-depth documentation of all peripherals and modules available for system and software implementers using or intending to use the Silicon Labs products. Characterization data, available modules and peripherals, memory sizes and memory addresses refer to each specific device, and "Typical" parameters provided can and do vary in different applications. Application examples described herein are for illustrative purposes only. Silicon Labs reserves the right to make changes without further notice to the product information, specifications, and descriptions herein, and does not give warranties as to the accuracy or completeness of the included information. Without prior notification, Silicon Labs may update product firmware during the manufacturing process for security or reliability reasons. Such changes will not alter the specifications or the performance of the product. Silicon Labs shall have no liability for the consequences of use of the information supplied in this document. This document does not imply or expressly grant any license to design or fabricate any integrated circuits. The products are not designed or authorized to be used within any FDA Class III devices, applications for which FDA premarket approval is required or Life Support Systems without the specific written consent of Silicon Labs. A "Life Support System" is any product or system intended to support or sustain life and/or health, which, if it fails, can be reasonably expected to result in significant personal injury or death. Silicon Labs products are not designed or authorized for military applications. Silicon Labs products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons. Silicon Labs disclaims all express and implied warranties and shall not be responsible or liable for any injuries or damages related to use of a Silicon Labs product in such unauthorized applications.

**Note: This content may contain offensive terminology that is now obsolete. Silicon Labs is replacing these terms with inclusive language wherever possible. For more information, visit [www.silabs.com/about-us/inclusive-lexicon-project](http://www.silabs.com/about-us/inclusive-lexicon-project)**

## Trademark Information

Silicon Laboratories Inc.<sup>®</sup>, Silicon Laboratories<sup>®</sup>, Silicon Labs<sup>®</sup>, SiLabs<sup>®</sup> and the Silicon Labs logo<sup>®</sup>, Bluegiga<sup>®</sup>, Bluegiga Logo<sup>®</sup>, EFM<sup>®</sup>, EFM32<sup>®</sup>, EFR, Ember<sup>®</sup>, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Redpine Signals<sup>®</sup>, WiSeConnect, n-Link, ThreadArch<sup>®</sup>, EZLink<sup>®</sup>, EZRadio<sup>®</sup>, EZRadioPRO<sup>®</sup>, Gecko<sup>®</sup>, Gecko OS, Gecko OS Studio, Precision32<sup>®</sup>, Simplicity Studio<sup>®</sup>, Telegesis, the Telegesis Logo<sup>®</sup>, USBXpress<sup>®</sup>, Zentri, the Zentri logo and Zentri DMS, Z-Wave<sup>®</sup>, and others are trademarks or registered trademarks of Silicon Labs. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keil is a registered trademark of ARM Limited. Wi-Fi is a registered trademark of the Wi-Fi Alliance. All other products or brand names mentioned herein are trademarks of their respective holders.



Silicon Laboratories Inc.  
400 West Cesar Chavez  
Austin, TX 78701  
USA

[www.silabs.com](http://www.silabs.com)