



# Wi-SUN SDK 2.3.0.0 GA

## Simplicity SDK Suite 2024.12.0

### December 16, 2024

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Wireless Smart Ubiquitous Network (Wi-SUN) is the leading IPv6 sub-GHz mesh technology for smart city and smart utility applications. Wi-SUN brings Smart Ubiquitous Networks to service providers, utilities, municipalities/local government, and other enterprises, by enabling interoperable, multi-service, and secure wireless mesh networks. Wi-SUN can be used for large-scale outdoor IoT wireless communication networks in a wide range of applications covering both line-powered and battery-powered nodes.

Silicon Labs' Wi-SUN hardware is certified by the Wi-SUN Alliance, a global industry association devoted to seamless LPWAN connectivity. Wi-SUN builds upon open standard internet protocols (IP) and APIs, enabling developers to extend existing infrastructure platforms to add new capabilities. Built to scale with long-range capabilities, high-data throughput and IPv6 support, Wi-SUN simplifies wireless infrastructure for industrial applications and the evolution of smart cities.

These release notes cover SDK versions:

2.3.0.0 released December 16, 2024.

## Compatibility and Use Notices

For information about security updates and notices, see the Security chapter of the Platform Release Notes installed with this SDK or on the TECH DOCS tab on <https://www.silabs.com/developers/wi-sun-protocol-stack>. Silicon Labs also strongly recommends that you subscribe to Security Advisories for up-to-date information. For instructions, or if you are new to the Silicon Labs Wi-SUN SDK, [Using This Release](#).

### Compatible Compilers:

IAR Embedded Workbench for ARM (IAR-EWARM) version 9.40.1

- 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 12.2.1, provided with Simplicity Studio.



#### KEY FEATURES

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##### Wi-SUN Stack

- Direct Connect
- PAN Defect

##### Wi-SUN Applications

- Border Router CLI source code
- Border Router CLI with Wi-Fi Backhaul

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# 1 Wi-SUN Stack

## 1.1 New Items

### Added in release 2.3.0.0

- Added `sl_wisun_br_set_ipv6_up_handler()` and `sl_wisun_br_ipv6_down()` APIs to route packet between a PAN network and an other network behind the border router. The use of those APIs is demonstrated in the new “**Wi-SUN – SoC Border Router CLI with Wi-Fi connectivity**” sample application. They can only be used from a border router.
- Added `sl_wisun_set_leaf()` API to make an FFN act as an RPL leaf. Leaf nodes are FFN that are not routing and are not advertising Pas and DIOs.
- Added `sl_wisun_set_tx_power_ddbm()` API to set the Tx power with a 0.1 dB resolution.
- Added `sl_wisun_trace_debug()`, `sl_wisun_trace_info()`, `sl_wisun_trace_warn()` and `sl_wisun_trace_error()` to trace events in Wi-SUN stack journal.
- Added `lfn_na_wait_duration_m` in FFN connection params to configure how often an FFN retransmits DAO on behalf of a registered LFN.
- Added `sl_wisun_set_phy_sensitivity()` API to override the default RX sensitivity for a chosen PHY.
- Introduced Direct Connect and associated APIs `sl_wisun_set_direct_connect_state()`, `sl_wisun_set_direct_connect_pmk()` and `sl_wisun_accept_direct_connect_link()`. They can be respectively used to enable Direct Connect, set Direct Connect security key, and accept a new Direct Connect link. It provides an alternate local interface. v2.3 only supports the server side of Direct Connect and only accepts one link establishment at a time. Refer to the dedicated documentation on docs.silabs.com for further information.
- Introduced PAN Defect and associated API `sl_wisun_br_pan_defect_advertise()` and event `SL_WISUN_MSG_PAN_DEFECT_IND_ID`. Refer to the dedicated documentation on docs.silabs.com for further information.
- Added Wi-SUN border router libraries and public APIs headers. They were previously kept private.
- Added DAO No-Path transmission to de-register a router prior to leaving the network.

## 1.2 Improvements

### Changed In release 2.3.0.0

- Updated the RX sensitivities with updated values.
- Updated Registration Refresh Request as mandated by FAN TPS 1.1v09.
- Updated NA channel plan 4 and 5 as mandated by PHY TPS amendment 1VA12.
- Improved retransmission mechanism. On rare occasions retransmission attempts were skipped because of a busy medium. In a different configuration, the number of collisions caused by hidden node communications was too high.
- Improved handling of parent changes / losses. The secondary parent selection and secondary parent route usage policies were reworked. Those modifications make the network more resilient to parent losses.
- Reduced weight given to the ETX first measure in the ETX EWMA. This created instabilities during the initial deployment of large networks by creating the impression that the link was either too good or too bad.
- Reduced weight given to the RSL first measure in the RSL EWMA.
- Reworked MAC, FFN and LFN bootstrap state machines.
- Raised TCP maximum segment size (mss).
- Dropped deprecated definitions related to socket options.

## 1.3 Fixed Issues

### Fixed in release 2.3.0.0

ID #	Description
1328491	Fixed an issue causing multicast packet lifetime to be extended. It was causing instability when the network was under a heavy multicast load.

ID #	Description
1375635	Fixed PAN cost calculation. An integer division was causing it to be systematically underestimated. This was causing invalid EAP target selections.
1379621	Fixed an interoperability issue caused by a incorrect behavior in case of EAP identified roll-over. The specification recommends using a random EAP identifier when starting a new authentication. Silicon Labs authenticator was always initializing the EAP identifier to 0, and the supplicant was not handling the roll-over.
1368019	Fixed a memory leak when a node was disconnected and had neighbors with registered POM-IE info.
1319942	Fixed RPL candidate parent set. The potential candidate RSL is now used as a criteria to be accepted in the candidate parent set. This modification reduces the number of probe transmissions made to compute the ETX.
1359822	Routers now immediately send probes to all new entries in the candidate set. Probes used to be transmitted every 30 minutes by default. This was causing the promotion of a candidate to preferred parent to take up to 30 minutes.
1361545	Fixed the transmission of a POM-IE containing only one entry.
1333058	Fixed multicast transmissions to LFN. The FFN parents were not properly tracking LFN's multicast group registration and deregistration.
1358322	Fixed an error causing IPV6 hop limit of multicast packets to be forwarded to LFNs. The outer header hop limit is not supposed to be forwarded to LFNs. This was a potential source of interoperability issues.
1367594	Fixed an invalid memory access of candidate parent times out while disconnected. On a candidate timeout, the stack tried to free all contexts. It was trying to free a context that was not initialized yet because it was in a disconnected state.
1323858	Routers were only deregistering from their preferred parent, skipping the deregistration from their secondary parent. This was causing routing errors after a reconnection.
1310166	Fixed a radio reconfiguration in case of RX timeout event. It was causing the radio to remain in the idle state until the next transmit event.

## 1.4 Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
1119464	Packets sent when FSK FEC is enabled can infringe ARIB regulation.	Until this problem has been addressed correctly, the stack will refuse to start if both ARIB enforcement and FEC are enabled.
1067978	Packets sent using a PHY with a bandwidth larger than the base PHY's bandwidth can infringe ARIB regulation.	Limit the communications when using mode switch with ARIB enforcement enabled.
1176014	FG25 asserts with a RAIL_ASSERT_FAILED_RTCC_SYNC_STALE_DATA error code when entering EM2.	Do not allow the power manager to go to EM2 by adding a requirement on EM1 in the application.
1373879	The RCP is unable to send packets using mode switch. It is running slower than the SoC routers, It leads to time out.	

## 1.5 Deprecated Items

None

## 1.6 Removed Items

None

## 2 Wi-SUN Applications

### 2.1 New Items

#### Added in release 2.3.0.0

- Wi-SUN - SoC Border Router CLI
  - Opened the source code of the application. It is now shared and the application can be built from Simplicity Studio.
  - Introduced a new variant of the application. That variant demonstrates how to setup a backhaul connectivity using Silicon Labs SiWx917 Wi-Fi NCP along with WiSeConnect SDK v3.4.0 and lwip. It can be used to connect multiple Wi-SUN PAN via a broader network behind the border router.
  - Added support for an external DHCPv6 server using a DHCPv6 relay.
- Wi-SUN – SoC Socket application is added. It is a merge of the following (removed) applications:
  - Wi-SUN – SoC UDP Client
  - Wi-SUN – SoC UDP Server
  - Wi-SUN – SoC TCP Client
  - Wi-SUN – SoC TCP Server

### 2.2 Improvements

#### Changed In release 2.3.0.0

- TFTP Improvements
  - Block Size Option (RFC 2348)
  - Timeout Interval Option (RFC 2349)
  - Added new configuration for OTA DFU component to set block size and timeout options with the following:
    - SL\_WISUN\_OTA\_DFU\_TFTP\_DATA\_BLOCK\_SIZE
    - SL\_WISUN\_OTA\_DFU\_TFTP\_TIMEOUT\_SEC
- Application memory statistic component improvements: print cosmetics and reduced verbosity.
- Wi-SUN Services related CLI components are merged into one: Wi-SUN CLI component. CLI commands can be turned ON/OFF separately on demand via configurations (SL\_WISUN\_OTA\_DFU\_CLI\_ENABLED, ...)
- Wi-SUN CoAP component improvements:
  - Tick event trigger feature for CoAP Notification Service
  - Optional verbose mode for CoAP Resource Handler
  - New CoAP Resource Handler extended auto response callback type to include source address as argument
  - Redirecting response feature for CoAP Resource Handler with custom callback to create new destination address
- API signature changes
  - `sl_status_t app_wisun_setting_set_tx_power(const int8_t * const tx_power) → sl_status_t app_wisun_setting_set_tx_power(const int16_t * const tx_power)`
  - `sl_status_t app_wisun_setting_get_tx_power(int8_t * const tx_power) → sl_status_t app_wisun_setting_get_tx_power(int16_t * const tx_power)`
  - `void sl_wisun_coap_rhnd_service_resp_received_hnd(sl_wisun_coap_packet_t * req_packet) → void sl_wisun_coap_rhnd_service_resp_received_hnd(const sockaddr_in6_t * const src_addr, sl_wisun_coap_packet_t * req_packet)`
  - `void sl_wisun_tcp_client_create(const char *ip_address, uint16_t port) → int32_t sl_wisun_tcp_client_create(const char *ip_address, uint16_t port)`
  - `void sl_wisun_udp_client_create(void) → int32_t sl_wisun_udp_client_create(void)`

## 2.3 Fixed Issues

### Fixed in release 2.3.0.0

ID #	Description
1333516	Fixed: TX Power setting (ddBm) in Wi-SUN Application Core component (multiply by 10 was missing).
1332965	Fixed: stop command can't stop TFTP file transmission (in case of OTA DFU also).
1305481	Fixed: heap usage printing issue at Application memory statistic component by replacing legacy heap statistics getter with Memory Manager's solution.
1295815	Reduced iPerf test result json length to fit in 1024 bytes (libcoap3 support).
1380166	Replaced polling connection loop with waiting for connection event in CoAP threads.
1362884	Wi-SUN SoC CLI: Fixed multicast group registration. The CLI command handler was still using the legacy socket API option type definition.

## 2.4 Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
1327376	The RCP UART driver is unstable under certain conditions that we have not able to identify for the moment. Those instabilities are causing CRC errors that the RCP or wsbrd is not able to recover from.	Use CPC instead of using the RCP light weight interface.
1067236	The border router RCP SPI interface is unstable when used with a throughput higher than 1 Mbytes/s	The use of border router RCP SPI interface is not recommended for the time being.
	Simplicity Studio – Network Analyzer: Wi-SUN Encrypted Packets are not supported Undecoded frames (only after Ack) according to PTI issues on Series 2	

## 2.5 Deprecated Items

None.

## 2.6 Removed Items

- Wi-SUN – SoC Meter application is removed, Wi-SUN – SoC CoAP Meter application can be turned to it by uninstalling Wi-SUN CoAP component
- Wi-SUN – SoC Collector application is removed, Wi-SUN – SoC CoAP Collector application can be turned to it by uninstalling Wi-SUN CoAP component

## 3 Using This Release

This release contains the following:

Wi-SUN stack library

Wi-SUN sample applications

Wi-SUN border router pre-compiled demos

Documentation

If you are a first time user, see <https://docs.silabs.com/wisun/latest/wisun-getting-started-overview/>

### 3.1 Installation and Use

The Wi-SUN SDK is provided as part of the Simplicity SDK, the suite of Silicon Labs SDKs. To quickly get started with the Simplicity SDK, install [Simplicity Studio 5](#), which will set up your development environment and walk you through Simplicity SDK 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, Simplicity SDK may be installed manually by downloading or cloning the latest from GitHub.

See [https://github.com/SiliconLabs/simplicity\\_sdk](https://github.com/SiliconLabs/simplicity_sdk) for more information.

Simplicity Studio installs the Simplicity SDK by default in:

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

Documentation specific to the SDK version is installed with the SDK.

### 3.2 Security Information

#### Secure Vault Integration

This version of the stack does not integrate Secure Vault Key Management.

## 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.

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## 3.3 Support

Development Kit customers are eligible for training and technical support. Contact Silicon Laboratories support at <http://www.silabs.com/support>.

## 3.4 SDK Release and Maintenance Policy

For details, see [SDK Release and Maintenance Policy](#).



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