SILICON LABS Wi-SUN SDK 1.5.2.0 GA Wireless Smart Ubiquitous Network Instruction Manual

Wi-SUN SDK 1.5.2.0 GA Wireless
Smart Ubiquitous Network
Instruction Manual

Contents [hide]

Wi-SUN SDK 1.5.2.0 GA Wireless Smart Ubiquitous Network

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:
1.5.2.0 released May 3, 2023
1.5.1.0 released March 8, 2023
1.5.0.0 released February 1, 2023
1.4.0.0 released December 14, 2022

KEY FEATURES

Wi-SUN Stack

- Added minimal support for FAN1.1 LFN (Limited Functional Node), including an API to configure the device role, and a new st of libraries supporting both LFN and FFN device types
- Added support for FAN 1.1 PHY mode switch
- Added support for FSK FEC
- Added support for EFR32FG25 – it supports all FAN1.1 OFDM modulation schemes and all FAN1.0 FSK configurations.
- Added support for EFF01

Wi-SUN Applications

- Added support for EFR32FG25
- Added FAN 1.1 PHY support (settings and CLI)
- Added a Copal Advanced Resource Handler
- Added support for imperf multicast
- Added support for CPC in Wi-SUN RCP

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/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, 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.

Wi-SUN Stack

New Items

Added in release 1.5.0.0

- Added a new SL_WISUN_SOCKET_OPTION_SEND_BUFFER_LIMIT socket option to configure the transmission buffer length. It is the equivalent of Posi SO_SNDBUF.
- Added a new SL_WISUN_PHY_CONFIG_IDS option in sl_wisun_join. It allows the selection of a specific radio configuration entry.
- Implemented LFN parent synchronization and time-out detection.
- Implemented LFN EAPOL accelerated listening schedule.

Added in release 1.4.0.0

- Added minimal support for FAN1.1 LFN (Limited Functional Node). LFN devices are able to connect and communicate but are not using any of the EFR32 energy management mode. As such, they are not optimized for battery powered devices and should only be used for evaluation and experimentation.
- Added a new API sl_wisun_set_device_type()that configures the role of device. It can be either a router (FFN – Full Functional Node) or an end node (LFN)
- Added a new set of libraries supporting both LFN and FFN device types. Those libraries are used when the new "Stack LFN Support" plugin is installed.
- Added support for FAN 1.1 PHY mode switch.
- Added a new API sl_wisun_set_mode_switch() that indicates if the device can mode switch with a given neighbor.
- Added new APIs sl_wisun_get_pom_ie()and sl_wisun_get_pom_ie() that write or read the content of the POM-IE (PHY Operating Mode Information Element). It contains the list of the PHY operating mode a node is willing to use for communication.
- Added a new API sl_wisun_join() that triggers a new connection. It can be used either with the old (1V08 – regulatory domain, operating class, operating mode) or the new (1VA8 – regulatory domain, channel plan id, PHY mode if) nomenclature. That new API is meant to replace sl_wisun_connect().
- Added a new API sl_wisun_set_connection_parameters() that extends the set of the configuration parameters. Used in pair with sl_wisun_join(), it replaces sl_wisun_connect() network size parameter.
- Added support for FSK FEC. FEC can be enable either by setting fec field of sl_wisun_phy_config_t structure or by using a PHY mode id that explicitly enables FEC.
- Added support of EFR32FG25. It supports all FAN1.1 OFDM modulation schemes and all FAN1.0 FSK configurations.
- Added support of EFF01

Improvements

Changed in release 1.5.1.0

- Reduced the NS(EARO) retry period during the first connection. It reduces the time to connect in case of retransmission and improves the process's reliability.

Fixed Issues

Added in release 1.5.2.0

ID #	Description
1078034	Fixed an RNG error that could happen on EFR32xG12.
1112966	Fixed an error causing LPA to be missed on PHY configurations using a lot of channels.
1107537	Fixed an error causing a segmentation fault on congested networks.
1098801	Unencrypted LPC were accepted by LFN when they shouldn't have been.
1094861	Fixed FEC support in Linux Border Router RCP.

Fixed in release 1.4.0.0

ID #	Description
1078454	The wrong radio entry could be used if a radio configuration file contained the same PHY more than once. It was always selecting the first entry found that matched the PHY characteristics. It was causing a single PHY to be selected instead of a multi-PHY and made the use of mode switch impossible.
1090805	Fixed timing drift calculation error that would lead to temporary desynchronization of broadcast frequency hopping.

Known Issues in the Current Release

None

Deprecated Items

Deprecated in release 1.4.0.0

- sl_wisun_connect() is replaced by sl_wisun_join().
- sl_wisun_set_channel_plan() is replaced by sl_wisun_join().
- sl_wisun_set_network_size() is replaced by sl_wisun_set_connection_parameters()

Wi-SUN Applications

New Items

Added in release 1.4.0.0

- Added support of EFR32FG25
- FAN 1.1 PHY support (settings and CLI)
- Copal Advanced Resource Handler
- Added support of CPC in Wi-SUN RCP

Improvements

Added in release 1.5.0.0

- Border router RCP
- Added support of firmware updates without CPC
- Added support of IAR

Added in release 1.4.0.0

- imperf Improvements
- CLI component is separated
- Multicast support

- Copal Improvements
- Resource Discovery Query Improvement
- Extended resource support (Copay Meter update also)
- Network Measurement Application Improvements
- Multicast support for ping and imperf
- Remote CLI control over Copal
- LCD GUI improvements
- PHY selection
- imperf test visualization
- GUI refactor
- Wi-SUN Configurator
- FAN1.1 PHY support beside FAN1.0
- Default PHY Selection
- Refactor memory management (Oz objects and their allocations are organized into heap)

Fixed Issues

Fixed in release 1.5.0.0

ID #	Description
1063593	Fixed a race in the border router RCP UART DMA driver on FG25. It was causing CRC errors and packet losses.

Known Issues in the Current Release

Issues in bold were added since the previous release.

ID #	Description	Workaround
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.	

2.5 Deprecated Items
None
2.6 Removed Items
None

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 QSG181: Silicon Labs Wi-SUN Quick-Start Guide.

Installation and Use

The Wi-SUN 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** for more information.
Simplicity Studio installs the GSDK by default in:

- (Windows): C:\Users\<NAME>\SimplicityStudio\SDKs\gecko_sdk
- (MacOS): /Users/<NAME>/Simplicity Studio/SDKs/gecko_sdk

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

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.

Update Preference

WHAT EMAILS WOULD YOU LIKE TO RECEIVE?

Newsletters
- [ ] Community Monthly Newsletter
- [ ] Sales Newsletter
- [ ] Micrium Newsletter

Product Specific Notifications
- [ ] Product Information and Newsletter
- [x] 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

[ ] Audio and Radio	[ ] Power over Ethernet
[ ] Interface	[ ] Sensors
[ ] Isolation	[ ] TV and Video
[ ] Modems and DAAs	[ ] Voice
[ ] Microcontrollers	[ ] Wireless
[ ] 8-bit MCUs	[ ] Bluetooth Classic
[x] 32-bit MCUs	[ ] Bluetooth Low Energy
[ ] Timing	[x] Proprietary
[ ] Clocks	[ ] Wi-Fi
[ ] Buffers	[ ] ZigBee and Thread
[ ] Oscillators	[ ] Z-Wave
[ ] CDR and PHY	

Support

Development Kit customers are eligible for training and technical support. 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	**SW/HW** www.silabs.com/simplicity	**Quality** www.silabs.com/quality	**Support & Community** 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 y reasons. Such changes will not alter the specifi cations or the per romance of the product. Silicon Labs shall have no liabilit y 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
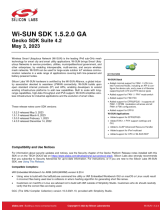
death. Silicon Labs products are not designed or authorized for military applications. Silicon Labs products shall under no circumstances be used in weapons of mass destruction including (but not limited to) nuclear, biological or chemical weapons, or missiles capable of delivering such weapons. Silicon 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 off endive terminology y 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**

Trademark Information

Silicon Laboratories Inc.® , Silicon Laboratories® , Silicon Labs® , SiLabs® and the Silicon Labs logo® , Bluegiga® , Blueridge Logo® , EFM® , EFM32® , EFR, Ember® , Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Repine Signals® , Disconnect , n-Link, Thread Arch® , EnLink® , Radio® , EZRadioPRO® , Gecko® , Gecko OS, Gecko OS Studio, Precision32® , Simplicity Studio® , Telegenic, the Telegenic Logo® , Suppress® , Sentry, the Sentry logo and Sentry DMS, Z-Wave® , and others are trademarks or registered trademarks of Silicon Labs. ARM, CORTEX, Cortex-M3 and THUMB are trademarks or registered trademarks of ARM Holdings. Keli 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

Documents / Resources

	SILICON LABS Wi-SUN SDK 1.5.2.0 GA Wireless Smart Ubiquitous Network [pdf] Instruction Manual Wi-SUN SDK 1.5.2.0 GA Wireless Smart Ubiquitous Network, 1.5.2.0 GA Wireless Smart Ubiquitous Network, Wireless Smart Ubiquitous Network, Smart Ubiquitous Network, Ubiquitous Network

References

- **Silicon Labs**
- **Silicon Labs**
- **Inclusive Lexicon Project - Silicon Labs - Silicon Labs**
- **Silicon Labs Community**
- **Internet of Things (IoT) - Silicon Labs**
- **Quality - Silicon Labs**
- **Simplicity Studio - Silicon Labs**
- **Technical Support - Silicon Labs**
- **GitHub - SiliconLabs/gecko_sdk: The Gecko SDK (GSDK) combines all Silicon Labs 32-bit IoT**

product software development kits (SDKs) based on Gecko Platform into a single, integrated SDK.

- **Wi-SUN Protocol Stack - Silicon Labs**