

# Zigbee EmberZNet SDK 7.5 GA Gecko SDK Suite 4.4 February 26, 2025

Silicon Labs is the vendor of choice for OEMs developing Zigbee networking into their products. The Silicon Labs Zigbee platform is the most integrated, complete, and feature-rich Zigbee solution available.

Silicon Labs EmberZNet SDK contains Silicon Labs' implementation of the Zigbee stack specification.

These release notes cover SDK version(s):

7.5 released February 26, 2025



#### **KEY FEATURES**

#### Zigbee

- Limited support of GCC LTO
- Zigbee R23 compliance
- Zigbee Smart Energy 1.4a compliance production
- Zigbee GP 1.1.2 compliance Alpha
- MG27 support production
- · Improved support for Secure Vault parts
- Sleepy support on NCP SPI (non-CPC) applications Alpha

### Multiprotocol

- Concurrent Listening support (RCP) MG21 and MG24
- Concurrent Multiprotocol (CMP) Zigbee NCP
   + OpenThread RCP production
- Dynamic Multiprotocol Bluetooth + Concurrent Multiprotocol (CMP) Zigbee and OpenThread support on SoC

### **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 <a href="https://www.silabs.com/developers/zigbee-emberznet">https://www.silabs.com/developers/zigbee-emberznet</a>. 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 Zigbee EmberZNet SDK, see 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.

The EZSP protocol version for this release is 0x0D.

### **Contents**

1	New	Items	3
	1.1	New Components	3
	1.2	New APIs	3
	1.3	New Platform Support	3
	1.4	New Documentation	3
	1.5	Intended Behavior	3
2	Impr	ovements	4
3	Fixe	d Issues	5
4	Kno	wn Issues in the Current Release	6
5	Dep	recated Items	9
6	Rem	noved Items	10
7	Mult	iprotocol Gateway and RCP	11
	7.1	New Items	11
	7.2	Improvements	11
	7.3	Fixed Issues	11
	7.4	Known Issues in the Current Release	11
	7.5	Deprecated Items	12
	7.6	Removed Items	12
8	Usin	g This Release	13
	8.1	Installation and Use	13
	8.2	Security Information	13
	8.3	Support	14
	8.4	SDK Release and Maintenance Policy	14
	8.5	Zigbee Certification	14

### 1 New Items

**Note**: EmberZNet 7.5 is a patch release and follows version 7.4.5.0, despite the minor version number increment. The minor version bump is due to the addition of optional Link Time Optimization (LTO) support in Zigbee. No EmberZNet API updates have been made in this release. For all previous release history, please refer to the 7.4.5.0 release notes.

### 1.1 New Components

New in release 7.5

None.

#### 1.2 New APIs

New in release 7.5

None.

### 1.3 New Platform Support

### New in release 7.5

Limited support of GCC LTO

This release supports use of GCC link time optimization for a very specific set of applications, namely dynamic multi protocol light.

This is achieved by creating and packaging an additional set of LTO aware zigbee gcc libraries in this release. The LTO variant of the zigbee libraries get linked to the application project when the application installs platform utility component toolchain\_gcc\_lto to the above application project.

This is limited support with minimal testing.

### 1.4 New Documentation

#### New in release 7.5

None.

### 1.5 Intended Behavior

Users are reminded that Zigbee unsynchronized CSL transmissions are subject to protocol preemption at the radio scheduler. In the SleepyToSleepy applications, BLE can and will preempt a Zigbee CSL transmission, which will terminate the transmission. Scheduler preemption is more common for unsynchronized CSL, given that a potentially lengthy wake up frame sequence may be used. Users wishing to adjust transmission priorities may use the DMP Tuning and Testing component to do so. Users may also consult <a href="UG305:Dynamic Multiprotocol User's Guide">User's Guide</a> for more information.

# 2 Improvements

# Changed in release 7.5

# 3 Fixed Issues

# Fixed in release 7.5

ID#	Description	
1350285	In rare cases, a packet may be passed to the Outgoing Packet Handoff Callback with a payload index parameter that exceeds the stated length of the packet buffer, leading to an assert in legacy-packet-buffer.c if the Packet Handoff component is enabled.	
1372892	Addressed the problem that we define these SL_ZIGBEE_AF_HAS_SECURITY_PROFILE_xxx macros while only considering Primary network security type on multi-network setup.  Other ref: 1357515	
1378044	Fixed an issue that caused the network steering to call network_found infinitely when too many beacons are present. This was achieved by appropriately clearing the scan state.  Other ref: 1340230	
1385679	Fixed an issue in the attribute metadata that caused the access of Electrical Measurement attributes to be read-only instead of read-write, as per the ZCL Specification.  Other ref: 1355154	
1386044	Fixed a compiler warning in throughput.c Other ref : 1385996	
1387545	Fixed an issue to remove the children immediately from the source route table of its parent after it left the network.  Other ref: 1383925	
1391005	Sub-GHz duty cycle calculations didn't properly account for 32-bit system timer rollover in timing bucket comparisons, which could result in a duty-cycle.c assert violation.	
1391595	Fixed key establishment that could send a bind request with incorrect EUI64.	
Fixed an issue that could pass an invalid mac layer packet to cause an assert.  Other ref: 1312097		
1391815	Fixed an issue where certain packets with invalid data regarding the APS frame size could trigger an assert if received.  Other ref: 1312098	
1391816	Fixed an issue that could pass an APS malformed packet to cause a bus fault.  Other ref : 1312099	
1392479	Allow users to configure Address Table Size (macro EMBER_ADDRESS_TABLE_SIZE) via zigbee_pro_stack component inside Simplicity Studio.  Other ref : 1369186	
1392557	Fixed several warnings in the framework code with IAR compiler. Other ref : 1363780	
1393550	Increased GP_INCOMING_FC_IN_SINK_TOKEN_TIMEOUT upper limit, so customers can adjust to avoid the flash wearing out quickly.	
1393796	Increased the GP_INCOMING_FC_TOKEN_TIMEOUT upper limit, so customers can adjust to avoid the flash wearing out quickly.  Other ref: 1370016	
1411844	Fixed an issue in sl_zigbee_token_factory_reset when reseting a large number of tokens to factory new. The iteration loop may take more time than the watchdog timeout, this fixes the issue by moving the watchdog refresh into the inner most iteration.  Other ref: 1352533	

# 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 <a href="https://www.si-labs.com/developers/zigbee-emberznet">https://www.si-labs.com/developers/zigbee-emberznet</a> in the Tech Docs tab.

ID#	Description	Workaround
N/A	The following apps/component is not supported in this release: EM4 support.	Feature will be enabled in subsequent releases.
193492	emberAfFillCommandGlobalServerToClientConfigureRe porting macro is broken. The filling of buffer creates incorrect command packet.	Use the "zcl global send-me-a-report" CLI command instead of the API.
278063	Smart Energy Tunneling plugins have conflicting treatment/usage of address table index.	No known workaround
289569	Network-creator component power level picklist doesn't offer full range of supported values for EFR32	Edit the range <-820> specified in the CMSIS comment for EMBER_AF_PLUGIN_NETWORK_CREATOR_RADIO_P OWER in the <sdk>/protocol/zigbee/app/framework/plugin/network-creator/config/network-creator-config.h file. For example, change to &lt;-2620&gt;.</sdk>
295498	UART reception sometimes drops bytes under heavy load in Zigbee+BLE dynamic multiprotocol use case.	Use hardware flow control or lower the baud rate.
312291	EMHAL: The halCommonGetIntxxMillisecondTick functions on Linux hosts currently use the gettimeofday function, which is not guaranteed to be monotonic. If the system time changes, it can cause issues with stack timing.	Modify these functions to use clock_gettime with the CLOCK_MONOTONIC source instead.
338151	Initializing NCP with a low packet buffer count value may cause corrupt packets.	Use the 0xFF reserved value for packet buffer count to avoid the too-low default value
387750	Issue with Route Table Request formats on end device.	Under Investigation
400418	A touchlink initiator cannot link to a non-factory-new end-device target.	No known workaround.
424355	A non-factory-new sleepy end device touchlink target- capable initiator is not able to receive a device information response in certain circumstances.	Under Investigation
465180	The Coexistence Radio Blocker Optimization item "Enable Runtime Control" may block proper Zigbee operation.	Optional 'Wi-Fi Select' Control of Blocker Optimization should be left "Disabled".
480550	The OTA cluster has its own built-in fragmentation method, hence it should not use APS fragmentation. Although, in case APS encryption is enabled it grows the payload of the ImageBlockResponses to a size where the APS fragmentation is activated. This could lead to the OTA process failing.	No known workaround
481128	Detailed Reset Cause and crash details should be available by default via the Virtual UART (Serial 0) on NCP platforms when Diagnostics plugin and Virtual UART peripheral are enabled.	Since Serial 0 is already initialized in the NCP, customers can enable the emberAfNcpInitCallback in the Zigbee NCP Framework and call the appropriate diagnostic functions (halGetExtendedResetInfo, halGetExtendedResetString, halPrintCrashSummary, halPrintCrashDetails, and halPrintCrashData) in this callback to print this data to Serial 0 for viewing in the Network Analyzer capture log. For an example of how to use these functions, refer to the code included in af-main-soc.c's emberAfMainInit() when EXTENDED_RESET_INFO is defined.

ID#	Description	Workaround
486369	If a DynamicMultiProtocolLightSoc forming a new network has child nodes remaining from a network it has left, emberAfGetChildTableSize returns a non-zero value in startIdentifyOnAllChildNodes, causing Tx 66 error messages when addressing the "ghost" children.	Mass-erase the part if possible before creating a new network or programmatically check the child table after leaving the network and delete all children using emberRemoveChild prior to forming a new network.
495563	Joining SPI NCP Sleepy End Device Sample App doesn't short poll, therefore the joining attempt fails at the state of Update TC Link Key.	The device that wishes to join should be in Short Poll mode before attempting to join. This mode can be forced by the End Device Support plugin.
497832	In Network Analyzer the Zigbee Application Support Command Breakdown for the Verify Key Request Frame mistakenly references the part of the payload that indicates the frame Source Address as the Destination Address.	No known workaround
519905 521782	SPI NCP may very rarely fail to start up bootloader communication using the 'bootload' CLI command of the ota-client plugin.	Restart the bootload process
620596	NCP SPI Example for BRD4181A (EFR32xGMG21) nWake default pin defined cannot be used as a wake-up pin.	Change the default pin for nWake from PD03 to a EM2/3 wake-up-enabled pin in the NCP-SPI Plugin.
631713	A Zigbee End Device will report address conflicts repeatedly if the plugin "Zigbee PRO Stack Library" is used instead of "Zigbee PRO Leaf Library".	Use the"Zigbee PRO Leaf Library" instead of the "Zigbee PRO Stack Library" plugin.
670702	Inefficiencies within the Reporting plugin can lead to significant latency based on data write frequency and table size, which may interfere with customer application code, including event timing.	If doing frequent writes, consider checking reporting conditions and sending reports manually rather than using the plugin.
708258	Uninitialized value in groups-server.c via addEntryToGroupTable() can create a spurious binding and cause groupcast reporting messages to be sent.	Add "binding.clusterId =  EMBER_AF_INVALID_CLUSTER_ID;" after "binding.type  = EMBER_MULTICAST_BINDING;"
757775	All EFR32 parts have a unique RSSI offset. In addition, board design, antennas and enclosure can impact RSSI.	When creating a new project, install the RAIL Utility, RSSI component. This feature includes the default RSSI Offset SiLabs has measured for each part. This offset can be modified if necessary after RF testing of your complete product.
758965	ZCL cluster components and ZCL command discovery table are not synchronized. Therefore, when enabling or disabling a ZCL cluster component, implemented commands will not be enabled/disabled in the corresponding ZCL Advanced Configurator command tab.	Manually enable/disable discovery for the desired ZCL commands in the ZCL Advanced Configurator.
765735	The OTA update fails on Sleepy End Device with enabled Page Request.	Use Block Request instead of Page Request.
845649	Removing CLI:Core component does not eliminate EEPROM cli calls to sl_cli.h.	Delete the eeprom-cli.c file that calls the sl_cli.h. Additionally, calls to sl_cli.h as well as sl_cli_command_arg_t in the ota-storage-simple-eeprom can be commented out.
857200	ias-zone-server.c allows for a binding to be created with a "00000000000000000" CIE address and posteriorly does not allow further bindings.	No known workaround
1019961	Generated Z3Gateway makefile hardcodes "gcc" as CC	No known workaround

ID#	Description	Workaround
1039767	Zigbee router network retry queue overflow issue in multi thread RTOS use case.	Zigbee Stack is not thread-safe. As a result, calling Zigbee stack APIs from another task is not supported in OS environment and may put the stack into "non-working" state. Refer to the following App note for more information and workaround using event handler. <a href="https://www.silabs.com/documents/public/application-notes/an1322-dynamic-multiprotocol-bluetooth-zigbee-sdk-7x.pdf">https://www.silabs.com/documents/public/application-notes/an1322-dynamic-multiprotocol-bluetooth-zigbee-sdk-7x.pdf</a>
1064370	The Z3Switch sample application only enabled one button (instance : btn1) by default that leads to mismatch in button description in the project file.	Workaround: Install the btn0 instance manually during Z3Switch project creation.
1161063	Z3Light and potentially other applications report incorrect cluster revision values.	Manually update the cluster revision attribute to their appropriate revision.
1164768, 1171478, 1171479	ERROR: ezspErrorHandler 0x34 reported repeatedly during mfglib receive mode	To reduce the error messages printed, configure EMBER_AF_PLUGIN_GATEWAY_MAX_WAIT_FOR_EV ENT_TIMEOUT_MS on the host app to 100, so the callback queue is freed more quickly.

# 5 Deprecated Items

Deprecated in release 7.5

# 6 Removed Items

Removed in release 7.5

# 7 Multiprotocol Gateway and RCP

#### 7.1 **New Items**

Added in release 7.5

None.

#### 7.2 **Improvements**

Changed in release 7.5

None.

### Fixed Issues

### Fixed in release 7.5

ID#	Description	
1275378	Fixed an issue where calling emberRadioSetSchedulerPriorities() prior to emberInit() could result in a crash (Other ref: 1381882).	
1361436	Fixed an issue that caused dmp_gp_proxy app (with CLI added) to fail to join a network on time.	
Zigbee stack initialization no longer activates the radio (or RCP for host stacks) prior to stack APIs being ca application. This prevents unwanted multi-PAN operation on Channel 11 (the default channel) when using a capable RCP configuration.		
1365665	Fixed an issue where the host would report receiving a packet with an invalid checksum on end-point 12. (Other ref: 1366154)	
1392787	Fixed an issue that caused Zigbeed not restart when performing a Trust Center Backup and Restore Reset Node action	
1405226	Fixed project migration issue and included OT project upgrade rule to reflect newer SDK changes. Note that when customers upgrade their Multiprotocol project, files like app.c will need to be manually ported to reflect newer SDK changes.	

### **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
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.
1122723	In a busy environment, the CLI may become unresponsive in the z3-light_ot-ftd_soc app.	No known workaround.
1124140	z3-light_ot-ftd_soc sample app is not able to form the Zigbee network if the OT network is up already.	Start the Zigbee network first and the OT network after.
1170052	CMP Zigbee NCP + OT RCP and DMP Zigbee NCP + BLE NCP may not fit on 64KB and lower RAM parts in this current release. (Other ref: 1393057)	64KB RAM parts are not recommended for NCP + RCP apps.
1209958	The ZB/OT/BLE RCP on MG24 can stop working after a few minutes when running all three protocols.	Will be addressed in a future release.

ID#	Description	Workaround
1221299	Mfglib RSSI readings differ between RCP and NCP.	Will be addressed in a future release.
1334477	Starting and stopping the BLE stack several times might result in the BLE stack not able to restart advertisement again on low RAM (64kB) Series 1 EFR devices in the DMP Zigbee-BLE sample application.	N/A

# 7.5 Deprecated Items

None

#### **Removed Items** 7.6

## 8 Using This Release

This release contains the following:

- Zigbee stack
- Zigbee Application Framework
- Zigbee Sample Applications

For more information about Zigbee and the EmberZNet SDK see <u>UG103.02: Zigbee Fundamentals</u>.

If you are a first-time user, see <u>QSG180: Zigbee EmberZNet Quick-Start Guide for SDK 7.0 and Higher</u>, for instructions on configuring your development environment, building and flashing a sample application, and documentation references pointing to next steps.

### 8.1 Installation and Use

The Zigbee EmberZNet 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 <a href="https://github.com/SiliconLabs/gecko">https://github.com/SiliconLabs/gecko</a> 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 <a href="https://docs.silabs.com/">https://docs.silabs.com/</a>.

### 8.2 Security Information

#### **Secure Vault Integration**

For applications that choose to store keys securely using the Secure Key Storage component on Secure Vault-High parts, the following table shows the protected keys and their storage protection characteristics that the Zigbee Security Manager component manages.

Wrapped Key	Exportable / Non-Exportable	Notes
Network Key	Exportable	
Trust Center Link Key	Exportable	
Transient Link Key	Exportable	Indexed key table, stored as volatile key
Application Link Key	Exportable	Indexed key table
Secure EZSP Key	Exportable	
ZLL Encryption Key	Exportable	
ZLL Preconfigured Key	Exportable	
GPD Proxy Key	Exportable	Indexed key table
GPD Sink Key	Exportable	Indexed key table
Internal/Placeholder Key	Exportable	Internal key for use by Zigbee Security Manager

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.

User applications never need to interact with the majority of these keys. Existing APIs to manage Link Key Table keys or Transient Keys are still available to the user application and now route through the Zigbee Security Manager component.

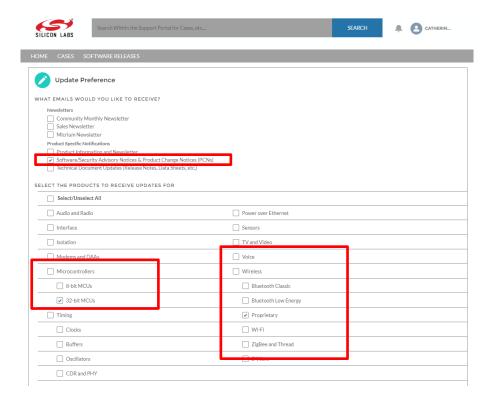
Some of these keys may become non-exportable to the user application in the future. User applications are encouraged to not rely on the exporting of keys unless absolutely necessary.

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.

The following figure is an example:



### 8.3 Support

Development Kit customers are eligible for training and technical support. Use the Silicon Laboratories Zigbee web page to obtain information about all Silicon Labs Zigbee products and services, and to sign up for product support.

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

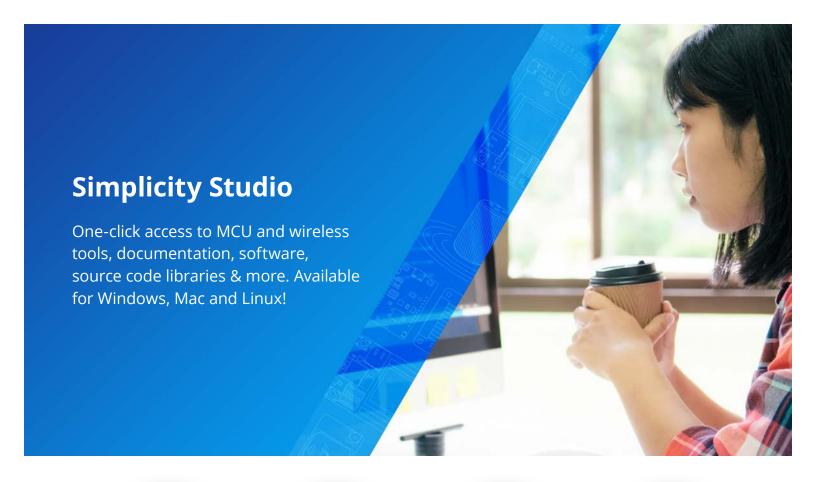
### 8.4 SDK Release and Maintenance Policy

For details, see SDK Release and Maintenance Policy

## 8.5 Zigbee Certification

The Ember ZNet 7.5 release has been qualified for Zigbee Compliant Platform for SoC, NCP and RCP architectures. For ZCP certification ID tied to this release, please check the CSA website here: https://csa-iot.org/csa-iot\_products/.

Please note that the ZCP certification is filed after the release and takes a few weeks before getting reflected on the CSA website. For any further queries, please contact Silicon Laboratories support at http://www.silabs.com/support.





**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 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 p

#### Trademark Information

Silicon Laboratories Inc.®, Silicon Laboratories®, Silicon Labs®, Silabs® and the Silicon Labs logo®, Bluegiga®, Bluegiga Logo®, EFM®, EFM32®, EFR, Ember®, Energy Micro, Energy Micro logo and combinations thereof, "the world's most energy friendly microcontrollers", Redpine Signals®, WiSeConnect, n-Link, EZLink®, EZRadio®, EZRadioPRO®, Gecko®, Gecko OS, Gecko OS Studio, Precision32®, Simplicity Studio®, Telegesis, the Telegesis Logo®, USBXpress®, Zentri, the Zentri logo and Zentri 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. 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