Z-Wave and Z-Wave Long Range 700 SDK 7.15.2.0 Pre-Certified GA

Gecko SDK Suite 3.1.1

January 27, 2020

Z-Wave and Z-Wave Long Range 700 are designed to meet the demands of the future smart home, where increasing needs for more sensors and battery-operated devices require both long range and low power. Context-aware environments are the next evolution in the smart home market, and they require technologies that have been optimized specifically for these applications.

100% Interoperable: Every product in the Z-Wave ecosystem works with every other product, regardless of type, brand, manufacturer or version. No other smart home/IoT protocol can make this claim.

Best-In-Class Security: Z-Wave's Security 2 (S2) framework provides end-to-end encryption and the most advanced security for smart home devices and controllers. Homes with S2 Z-Wave devices are virtually un-hackable.

SmartStart Easy Installation: SmartStart radically simplifies the installation of smart devices by using QR code scans for uniform, trouble-free setup. Devices and systems can be pre-configured dramatically easing deployments.

Backwards-Compatible: Z-Wave certification mandates backward-compatibility. The very first Z-Wave devices on the market, more than ten years old still perform as intended in networks with the latest Z-Wave technologies.

The Z-Wave and Z-Wave Long Range 700 SDK v7.15.2 Pre-Certified GA, see section 6 Product Life Cycle and Certification.

Z-Wave

KEY FEATURES

- New Z-Wave Long Range protocol for the US market
- All Apps support both Z-Wave and Z-Wave Long Range
- All Apps are Z-Wave certified and Z-Wave Long Range pre-certified
- New Z-Wave PC-based Controller v5.51 supporting Z-Wave Long Range
- New Z-Wave PC-based Zniffer v4.65 supporting Z-Wave Long Range
- New Network Analyzer supporting Z-Wave and Z-Wave Long Range

These release notes cover SDK version(s):

7.15.2.0 Pre-Certified GA released January 27, 2021
7.15.1.0 Pre-Certified GA released December 9, 2020

Compatibility and Use Notices

Note: The supported compiler will be upgraded to ARM GCC-10-2020-q4-update in the next major release.

If you are new to the Z-Wave 700 SDK, see Using This Release.

Contents

1 Z-Wave Protocol

1.1 New Items

New in version 7.15.1.0

This release now supports the Z-Wave Long Range (LR) specification that allows for up to +30 dBm, more than 4,000+ node network support, up to 10-year coin cell battery life, and maintains Z-Wave backward compatibility and interoperability.

The Z-Wave Long Range 700 delivers up to 1-mile outdoor line-of-sight range achieved at +14 dBm output power. Furthermore, it brings Z-Wave beyond the home into larger properties and multi-dwelling units.

1. Increased Coverage
   Z-Wave 700 with LR devices enable wireless coverage beyond the yard, resulting in complete home or building area coverage with no need for repeaters. Z-Wave LR eliminates the need for network repeaters/mesh by increasing the transmission range found between Z-Wave devices up to 1 mile when using Z-Wave 700, with the potential for even longer range with additional external amplification. The increased range unlocks new potential for Z-Wave networks beyond the home and into larger properties such as hotels and multi-dwelling units (MDU), while making it easier than ever before to enroll IoT devices deployed at the end of the yard or beyond for enhanced functionality.

2. Increased Scalability
   As the average number of installed smart home devices continues to increase, so too does the strain on the network. To support the upward trend in the number of sensor and IoT devices within homes and MDU environments, the Z-Wave 700 with LR ***currently*** increases scalability on a single IoT network up to 1,000 nodes, with future support for 4,000+ nodes coming soon.

3. Optimized Battery Life with Dynamic Transmit Power Control
   Dynamic transmit power control of every transmission optimizes the current draw based on practical range needs after taking into account noise floor and information on additional interferers. Z-Wave LR does not waste any power and increases the battery lifetime, enabling typical sensor use cases with up to 10 years on a coin cell battery.

4. Interoperable and Backwards Compatible
   Z-Wave 700 with LR devices (ZGM130S, EFR32ZG14) go through same Z-Wave Plus V2 certification program as Z-Wave devices, enabling them to be installed within any existing Z-Wave network. These devices feature interoperability and backwards compatibility with any previously installed Z-Wave device. The Wave Long Range functionality requires both an end node and a gateway/controller to support Long Range. All Z-Wave Long Range based devices only support SmartStart as inclusion method and S2 Authenticated is the lowest class key allowed. However, Z-Wave Long Range ***currently*** only supports the US market.

5. Addressing New Markets
   Z-Wave 700 with LR makes it possible to extend robust, scalable Z-Wave wireless connectivity to MDU, hospitality and commercial uses cases, as well as large public venue networks such as airports, stadiums and arenas.

6. Certification
   The Z-Wave 700 devices with LR will be certified under the Z-Wave Plus V2 certification program starting Q1 2021.

1.2 Improvements

None

1.3 Fixed Issues

Fixed in release 7.15.2.0 Pre-Certified GA

ID #	Description
433582	The supply voltage of the EFR32ZG14 SoC for gateways must be 2.5 V or higher. This will ensure stable operation, since low noise DCDC conversion is enabled on the SoC instead of DCDC bypass.
648653	Setting SmartStart interval > 512 seconds before a sensor will enter EM4 only works for the first sleep interval.
666273	After exclusion from the network the excluding Z-Wave Controller should send Transfer End to HomeID to 00 00 00 00. However, it sends to old Home ID.
656609	When Z-Wave Long Range frames are transmitted the sequence number is always ZERO but should be handled like sequence numbers are handled in a 3 channel region.

Fixed in release 7.15.1.0 Pre-Certified GA

ID #	Description
448729	Virtual nodes on a bridge controller will ack frames from a foreign homeID when the bridge controller is in the process of adding a node to the network.

1.4 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/products/software.

ID #	Description	Workaround
355095	In small networks Assign Return Routes will only generate direct range or one-hop routes even though multi-hop routes are possible.	None
361273	Transport Service is used when it is necessary to split a frame in two parts due to size. However, Transport Service does not forward RSSI information from the lower layers but only routing information. The RSSI value is the difference between LWR RSSI and background RSSI. As a consequence it is not possible to use RSSI for large frames handled by Transport Service in a network health calculation.	None
650818	**QR Code must be extended to contain information about supported protocols to be Z-Wave Long Range certified according to Alliance specification 2020D. A new TLV is added in the list of TLVs for the QR Code called Supported Protocols. If the region is US Z-Wave Long Range the Supported Protocols must contain both Z-Wave and Z-Wave Long Range, all other regions should only have the Z-Wave protocol as supported.**	**None**
656604	**Z-Wave Long Range Application can have more than one destination in the Lifeline association group.**	**None**
655801	**Z-Wave Long Range controller will acknowledge and answer a Request Node Information frame with a foreign HomeID if the destination NodeID in the frame matches a virtual node in the controller.**	**None**
653825	**SerialAPI controller on KR frequency starts sending frames with CRC errors in a stress test where the controller continuously transmits frames to a FLiRS node. Once the controller starts sending frames with CRC errors it does not recover.**	**None**
473714	**The Tx power for broadcast frames is not reduced correctly on Z-Wave frames. This can result in unstable inclusion when doing direct range inclusion of end nodes on the edge of range.**	**None**

1.5 Deprecated Items

None

1.6 Removed Items

None

2 Z-Wave Plus V2 Application Framework

2.1 New Items

None

2.2 Improvements

None

For a detailed description of application development using the Z-Wave Plus V2 Framework, refer to *INS14259: Z-Wave Plus V2 Application Framework SDK7.*

2.3 Fixed Issues

Fixed in release 7.15.1.0 Pre-Certified GA

ID #	Description
641920	Fixed a problem for endpoints higher than seven that was not transmitted
653329	DCDC converter not set to LowNoise mode after waking up from EM2.

2.4 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/products/software.

ID #	Description	Workaround
369430	All S2 multicast frames are sent using verified delivery S2_TXOPTION_VERIFY_DELIVERY whether or not a response is expected.	Change source code depending on the frame sent.
665434	**When performing Z-Wave Long Range OTA firmware update from v7.15.1 to v7.15.2 with a controller with a 16-bit virtual nodeID (4001-4005), the Firmware update MD status report is not sent to the controller at the end of the process.** **The cause is that the nodeID is saved to a file just before OTA update. In v7.15.1 the nodeID was saved to a uint8_t variable so a node ID like 4002 will be saved as 162. After OTA is completed the file is read and the node will try to send a status report to 162 instead of 4002.** **The bug has been fixed so v7.15.2 can be updated to later versions, but unfortunately we cannot change the file structure in v7.15.1 that is already released.**	**None**
473723	**True status doesn't report correctly if there are multiple instances like colors (in Color Switch CC), endpoints, etc.**	**None**

2.5 Deprecated Items

None

2.6 Removed Items

None

3 Certified Applications

3.1 Door Lock Key Pad

3.1.1 New Items

None

3.1.2 Improvements

None

3.1.3 Fixed Issues

None

3.1.4 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/products/software.

ID #	Description	Workaround
668117	**Devices programmed with SensorPIR or DoorLockKeyPad applications in Simplicity Studio 5 do not return to EM2 sleep (which consumes a few µA) but are left consuming ~3 mA.**	**Power cycle the radio board.**
652906	**RSSI measurements on classic channels fail after reset or power cycle.**	**None**

3.1.5 Deprecated Items

None

3.1.6 Removed Items

None

3.2 LED Bulb

3.2.1 New Items

None

3.2.2 Improvements

None

3.2.3 Fixed Issues

None

3.2.4 Known Issues in the Current Release

None

3.2.5 Deprecated Items

None

3.2.6 Removed Items

None

3.3 Power Strip

3.3.1 New Items

None

3.3.2 Improvements

None

3.3.3 Fixed Issues

None

3.3.4 Known Issues in the Current Release

None

3.3.5 Deprecated Items

None

3.3.6 Removed Items

None

3.4 Sensor PIR

3.4.1 New Items

None

3.4.2 Improvements

None

3.4.3 Fixed Issues

None

3.4.4 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/products/software.

ID #	Description	Workaround
386208	Sensor PIR does not always generate SHORT_PRESS events for short button presses in EM4. If the device has been awakened by a button press, the button handling logic starts by looking at the current state of the button. If the button is UP, a SHORT_PRESS event is immediately sent to the application. If the button is DOWN, then the de-bouncing logic is triggered to properly generate HOLD or LONG_PRESS events as needed. However, this leaves a tiny timing window where the button could be DOWN when initially tested, but is released before the DOWN time required for the de-bouncing logic to generate even a SHORT_PRESS event.	Prolong button press to allow detection of SHORT_PRESS by the de-bouncing logic.
655801	**A Z-Wave virtual node replies to a frame sent from a foreign network having the same node ID.**	**None**
668117	**Devices programmed with SensorPIR or DoorLockKeyPad applications in Simplicity Studio 5 do not return to EM2 sleep (which consumes a few µA) but are left consuming ~3 mA.**	**Power cycle the radio board.**

3.4.5 Deprecated Items

None

3.4.6 Removed Items

None

3.5 Switch On/Off

3.5.1 New Items

None

3.5.2 Improvements

None

3.5.3 Fixed Issues

Fixed in release 10.15.2.0 Pre-Certified GA

ID #	Description
654209	After OTA firmware update to a Z-Wave Long Range Switch On/Off, it did not return its Firmware Update MD Status Report to the controller.

3.5.4 Known Issues in the Current Release

None

3.5.5 Deprecated Items

None

3.5.6 Removed Items

None

3.6 Wall Controller

3.6.1 New Items

None

3.6.2 Improvements

None

3.6.3 Fixed Issues

None

3.6.4 Known Issues in the Current Release

None

3.6.5 Deprecated Items

None

3.6.6 Removed Items

None

4 Serial API Bridge Controller

Unchanged serial interface version 8.

4.1 New Items

None

4.2 Improvements

None

4.3 Fixed Issues

Fixed in release 7.15.2.0 Pre-Certified GA

ID #	Description
666885	Serial API controller doesn't sent a wake up beam to a Z-Wave Long Range Door Lock Key Pad.

4.4 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/products/software.

ID #	Description	Workaround
387655	Pre-built SerialAPI delivered in Simplicity Studio will not work if the ZG14 bootloader is also flashed to the radio board.	Use serialAPI without bootloader or, if OTW support is needed, contact the Z-Wave Apps team for workaround.

4.5 Deprecated Items

None.

4.6 Removed Items

None

5 Using This Release

This release contains the following

- Z Wave Plus V2 Application Framework
- Z-Wave Certified Applications for a broad range of smart home applications
- Z-Wave Protocol and Serial API Applications

If you are a first-time user, Z-Wave documentation is installed with the SDK. See INS14280: Z-Wave 700 Getting Started for End Devices, INS14278: How to Use Certified Apps in Z-Wave 700, and INS14281: Z-Wave 700 Getting Started for Controller Devices for instructions.

This SDK depends on a Gecko Platform. The Gecko Platform code provides functionality that supports protocol plugins and APIs in the form of drivers and other lower layer features that interact directly with Silicon Labs chips and modules. Gecko Platform components include EMLIB, EMDRV, RAIL Library, NVM3, and mbedTLS. Gecko Platform release notes are available through Simplicity Studio's Launcher Perspective.

5.1 Installation and Use

Order a Z-Wave 700 Wireless Starter kit. The kit offers the easiest and fastest way to start evaluation and development of your own Z-Wave 700 mesh application. It provides a single world-wide development kit for both end devices and gateways with multiple radio boards, in which to enable developers to create a mesh network and evaluate the Z-Wave 700 module.

Download and install Simplicity Studio from https://www.silabs.com/support/getting-started/mesh-networking/z-wave/z-wave-700. Installation instructions are available in the Simplicity Studio 5 User's Guide. Simplicity Studio ensures that most software and tool compatibilities are managed correctly. Install software and board firmware updates promptly when you are notified.

After Simplicity Studio installs, select **Install By Product Group**, check **Z-Wave**, and follow the steps to install the SDK.

Documentation specific to the SDK version is installed with the SDK. API references and other information about this and earlier releases are available on https://docs.silabs.com/.

To implement a specific application, Silicon Labs recommends starting with one of the existing pre-certified apps with the desired Role Type.

5.2 Support

Development Kit customers are eligible for training and technical support.

See support resources and contact Silicon Laboratories support at http://www.silabs.com/support.

6 Product Life Cycle and Certification

Silicon Labs will add new features based on market requirements and continuously improve the Z-Wave Protocol to position the Z-Wave Ecosystem. The Z-Wave Protocol Life Cycle is a process to provide rapid innovation, new features, and robust matured protocol release to Z-Wave Partners. The Z-Wave Protocol Life Cycle defines the maturation process of Z-Wave Protocol generations and consist of three phases divided in five Life Cycle stages.

Ascent Phase (BETA)

Silicon Labs releases new Z-Wave protocol generations (branches), i.e., initial BETA release of a Z-Wave Protocol generation that will introduce major new features/functions or support for a new Z-Wave Single Chip generation. This release is not certified and not eligible for certification.

Maturity Phase (ACTIVE/MAINTAINED)

Each new generation will generate follow-on matured releases to resolve protocol issues prioritized by Silicon Labs and based on input from Z-Wave Alliance Partners.

Decline Phase (MONITORED/OBSOLETE)

After a period of 17-24 months in the maturity phase a branch/release is discontinued and for an additional period (up to 24 months) a discontinued branch/release will be monitored since products based on this branch may still be shipping or under warranty in the field.

Table 6-1. Z-Wave SDK Life Cycle Status

Series	Branch	SDK Version	Release Date [DD/MM/YYYY]	Life Cycle Status
700	7.1x.x	7.15.2 Pre-Certified GA	27/01/2021	Active
		7.15.1 Pre-Certified GA	09/12/2020	Maintained
		7.14.3 GA	14/10/2020	Maintained
		7.14.2 GA	09/09/2020	Maintained
		7.14.1 GA	29/07/2020	Maintained
		7.14.0 Beta	24/06/2020	Obsolete
		7.13.6 GA	27/05/2020	Monitored
		7.13.5 GA	29/04/2020	Monitored
		7.13.4 GA	15/04/2020	Monitored
		7.13.3 GA	20/03/2020	Monitored
		7.13.2 GA	21/02/2020	Monitored
		7.13.1 GA	24/01/2020	Monitored
		7.13.0 Beta	13/12/2019	Obsolete
		7.12.2 GA	26/11/2019	Obsolete
		7.12.1 GA	20/09/2019	Obsolete
		7.11.1 GA	12/07/2019	Obsolete
		7.11.0 GA	29/03/2019	Obsolete

A change in the Z-Wave SDK utilized for a specific device does require recertification; however, the type of certification required, the amount of testing needed, and the associated fees depend on the scope of the change.

Table 6-2. Z-Wave Certification in case of a SDK upgrade.

SDK Version	Upgrade to SDK Version	Type of Certification
7.15.2 Pre-Certified GA	NA	-
7.15.1 Pre-Certified GA	7.15.2 Pre-Certified GA	Full certification
7.14.3 GA	7.15.2 Pre-Certified GA	Full certification
7.14.2 GA	7.14.3 GA	Re-certification
7.14.1 GA	7.14.2 GA	Re-certification
7.14.0 Beta	7.14.1 GA	Full certification
7.13.6 GA	7.14.1 GA	Re-certification
7.13.5 GA	7.13.6 GA	Re-certification
7.13.4 GA	7.13.5 GA	Re-certification
7.13.3 GA	7.13.4 GA	Re-certification
7.13.2 GA	7.13.3 GA	Re-certification
7.13.1 GA	7.13.2 GA	Re-certification
7.13.0 Beta	7.13.1 GA	Full certification
7.12.2 GA	7.13.1 GA	Re-certification
7.12.1 GA	7.13.1+ GA	Re-certification
7.11.1 GA	7.14.1+ GA 7.13.1+ GA	Re-certification Re-certification
7.11.0 GA	7.14.1+ GA 7.13.1+ GA	Re-certification Re-certification

Notice that 7.15.2 Pre-Certified GA is certified for Z-Wave according to the 2020B Specification Release and pre-certified for Z-Wave Long Range. Pre-certified means that the final version of the Z-Wave Long Range certification tests was not available at the point of this release. The Z-Wave Long Range certification will be performed based on the 2020C specifications test suites and is anticipated to begin April 1, 2021.

7 Legal

7.1 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.

7.2 Trademark Information

Silicon Laboratories Inc.®, Silicon Laboratories®, Silicon Labs®, SiLabs® and the Silicon Labs logo®, Bluegiga®, Bluegiga Logo®, ClockBuilder®, CMEMS®, DSPLL®, EFM®, EFM32®, EFR, Ember®, Energy Micro, Energy Micro logo and combinations thereof, “the world’s most energy friendly microcontrollers”, Ember®, EZLink®, EZRadio®, EZRadioPRO®, Gecko®, Gecko OS, Gecko OS Studio, ISOmodem®, Precision32®, ProSLIC®, Simplicity Studio®, SiPHY®, 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.