Zigbee EmberZNet SDK 6.9.1.0 GA
Gecko SDK Suite 3.1
January 27, 2021

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):

6.9.1.0 released January 27, 2021
6.9.0.0 released December 9, 2020

KEY FEATURES

- Updated ZCL framework to ZCL 8
- Added low power (EM2) support for EFR32MG21 DMP applications
- Added bidirectional messaging for Green Power
- Updated door lock cluster
- Removed EM35x part support

Compatibility and Use Notices

If you are new to the EmberZNet SDK, see Using This Release.

Compatible Compilers:

Note: The supported compilers will be upgraded to ARM GCC-10-2020-q4-update and IAR 8.50.9 in the next major release.

IAR Embedded Workbench for ARM (IAR-EWARM) version 8.30.1.

- 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 7.2.1, provided with Simplicity Studio.

Contents

1 New Items

1.1 New Plugins

Added in release 6.9.0.0

RTOS Common

The RTOS Common plugin has been added to support the integration of the CMSIS-RTOS2 RTOS abstraction layer. For more information refer to the RTOS Integration section.

FreeRTOS

The FreeRTOS plugin has been added to support the integration of the CMSIS-RTOS2 RTOS abstraction layer. Note, the plugin is only alpha quality in its current state. For more information refer to the RTOS Integration section.

1.2 New APIs

Added in release 6.9.0.0

Green Power Bidirectional Messaging

In this release, the proxy implementations now include a compile-time option of the bidirectional communication advanced feature. This feature allows the proxy to participate in bidirectional operational message transactions by processing the gp response to submit the outgoing GPDF to DGp stub.

The DGp stub layer of the Green Power library implements multiple transmit queues, one per GPD, to hold the outgoing GPDFs when the proxy is elected as temp master. A set of new interface functions is available as access APIs for these APIs from SoC.

For open issue related to BRD4161A board please refer to the Known Issues section.

emberAfPluginScenesServerCustomRecallSceneCallback()

The Scenes cluster plugin now offers the callback function emberAfPluginScenesServerCustomRecallSceneCallback() to allow a developer to implement custom transitional behavior for the RecallScene command. See the callback function description in the API documentation for detailed description. If this callback is not implemented, the plugin's default behavior is applied (immediately set all attributes to the values specified in the selected scene, without any consideration for transition time / gradual transition).

1.3 New Sample Applications

Added in release 6.9.1.0

TRaC_TestHarnessZ3

A new sample application to generate Z3 Test Harness firmware for ZTT. It is recommended that customers do not use this app directly, and instead use the ZTT-provided app.

1.4 New Platform Support

Added in release 6.9.0.0

Added support for BRD4190A, next generation dual-phy board.

Added NCP framework support for the following parts and board:
- MGM210L022JIF (and BRD4309A)
- MGM210L022JIF (and BRD4309A)
- MGM210L022JNF
- MGM210LA22JIF (and BRD4309B)
- MGM210LA22JNF

RSSI Offset

The RSSI HWConf component can be used to configure the RSSI offset based on your part or board. On Series 1 and EFR32xG21 parts this offset is non-zero by default when enabled as those chips were shipped with a known offset. When enabling this consider carefully how this interacts with CCA checking and any CCA thresholds programmed into parts in the field via manufacturing tokens.

2 Improvements

2.1 Plugin Changes

Changed in release 6.9.0.0

Packet Handoff: The packet handoff plugin has been extended to support additional packet types on both the outgoing and the incoming side. The supported packet types are: Raw, Beacon, MAC, NWK_Data, NWK_Command, APS_Data, APS_Command, ZDO, ZCL, and Interpan. In addition to being able to accept, drop or mangle every packet type, further packet actions have been added for NWK layer packets.

MbedTLS: The mbedTLS plugin is updated to include the updated version of mbedTLS 2.24.

Idle Sleep: Idle and sleep support for EFR32xG2x parts is now enabled for the Zigbee-BLE DMP applications.

BLE: The BLE plugin is updated to accommodate underlying changes in the Bluetooth SDK and in the RTOS abstraction layer.

Micrium RTOS: The Micrium RTOS plugin has been changed to better support the integration of the CMSIS-RTOS2 RTOS abstraction layer. Plugin options are moved to the new RTOS Common plugin. For more information refer to the RTOS Integration section.

2.2 API Changes

None

2.3 Sample App Changes

None

2.4 Framework Changes

Changed in release 6.9.0.0

RTOS Integration

The CMSIS-RTOS2 RTOS abstraction layer is integrated to the Zigbee stack. Most former options of the Micrium RTOS plugin are now moved to the new RTOS Common plugin. In addition, the FreeRTOS plugin has been added. Note, the FreeRTOS plugin is currently only alpha quality.

A legacy Zigbee RTOS-based application with the Micrium RTOS plugin enabled will be subject to an upgrade in Simplicity Studio v5.1. The upgrade rule enables the new RTOS Common plugin and migrates the Micrium RTOS plugin's option settings to the RTOS Common plugin.

Zigbee Cluster Library

The ZCL implementation is updated to align with ZCL8 with specific treatment for the following Zigbee Alliance CCBs:

1955 - Add Tunneling cluster Protocol IDs for IPv4 and IPv6
2310 - Error INVALID_VALUE for out-of-range Group ID
2427 - Default Response handling for Recall Scene command
2454 - BatteryAlarmState attribute is Reportable
2477 - ZCL status code cleanup
2543 - Complex attribute types (struct, array, set, bag) are UNREPORTABLE_ATTRIBUTE
2555 - Correct default for Window Covering cluster CurrentPositionLiftPercentage attribute
2560 - Correct default for Thermostat cluster Occupancy attribute
2722 - Basic ZCLVersion value is 8 beginning with ZCL8
2815 - Defaults values for Thermostat AC attributes
2823 - Temperature Measurement attribute defaults should be signed values
2893 - Treat Time cluster Time attribute as READ_ONLY if master bit in TimeStatus is set
2898 - Level cluster MoveToClosestFrequency command payload field type

Additionally, the global ClusterRevision attribute now reports the correct cluster revision for the attribute instance's respective cluster.

Door Lock Cluster

Support for the ZCL Door Lock cluster has been expanded to reflect capabilities described in the June 11 2020 Zigbee Alliance document 20-52431-003-Door Lock NFR changes to 14-0131-16-zcl-ch-7-closures-0611.docx. In summary:

- "Ajar" status in the Basic Information attribute and "Door ajar" in the AlarmMask attribute
- "Coerced User" in User type and "Coerced Alarm" in the AlarmMask attribute
- ZCL commands relating to Disposable User and Schedule
- ZCL commands relating to Biometric credentials
- Medium level for the SoundVolume attribute

ZCL Level Cluster

The SDK's definition of the ZIgbee Cluster Library Level cluster is expanded to include entries for the MinLevel, MaxLevel, CurrentFrequency, MinFrequency, and MaxFrequency attributes, and for the MoveToClosestFrequency command. These items are now presented in AppBuilder to assist developers who may wish to use them. However, the SDK's level-control plugin (sample code not intended for production use) has not been modified to support them.

2.5 Documentation Changes

Changed in release 6.9.0.0

The descriptive text for emberAfIncomingPacketFilterCallback and emberAfOutgoingPacketFilterCallback has been modified to correct some formatting anomalies.

3 Fixed Issues

Fixed in release 6.9.1.0

ID #	Description
349916	Fixed message timeout to scale with with discovery timeout value for discovery timeouts greater than 3 seconds.
439062	Fixed the issue that, when receiving a Network Status command with specific status values as a broadcast, the command frame is neither retransmitted nor added to the broadcast transaction table.
439677	Network Creator Security's close network action now closes the network for new joins but allows rejoins. Previously, both joins and rejoins were denied when the close action was invoked. This action is invoked by either calling emberAfPluginNetworkCreatorSecurityCloseNetwork or `plugin network-creator-security close-network`.
476765	Included logic to ensure the ZA09 key is not stored in the transient link key table and won't be used for a distributed network.
489416	The Custom ZCL XML now supports three new xml attributes in the ZCL "attribute" tag: reportMaxInterval="", reportMinInterval="", and reportableChange="". These are defaults that will be displayed in the ZCL tab in AppBuilder.
492394	Zigbee apps will no longer enable hardware flow control by default. It must be specified by the user.
627210	Parents will check for a moved child for any valid incoming message, even if an address conflict can't be ruled out.
635200	CLI command "plugin network creator form ...." now triggers emberAfPluginNetworkCreatorCompleteCallback().
636250	DMP projects will now allow application RTOS tasks that are lower priority than the Zigbee task to run when the idle/sleep plugin option to "stay awake when not joined" is turned on, regardless of the network state. Previously, the Zigbee task would not yield when the node was not on a network.
645704	In the optional packet handoff plugin, the index passed to emberPacketHandoffIncoming(EMBER_ZIGBEE_PACKET_TYPE_BEACON ,...) and emberPacketHandoffIncoming(EMBER_ZIGBEE_PACKET_TYPE_ENHANCED_BEACON ,...) has been fixed to start with the 1st byte of the actual (enhanced) beacon payload.
645882	An issue has been fixed where the NCP would be reset after the message "ERROR: ezspErrorHandler 0x36" is printed. The EZSP error indicates that all the buffers on the NCP are depleted. Whereas the NCP would be reset in such a situation, the NCP is now kept running, as this particular situation may be recoverable. Additionally, the user may decide what action to take by consuming the emberAfPluginZclFrameworkCoreEzspErrorCallback callback. Situations where buffers can deplete include heavy network congestion. It is strongly recommended to avoid network configurations that involve an unsustainable amount of network traffic.
651361	Added upgrade rule for removing BSP_COEX_DP_RACLNAEN_INV_CHANNEL from hwconf files.
652580	The green power plugin option parameter proxyHiddenEndpoint is changed to 1 from 2. This will forward the green power notifications within the combo node with source endpoint as 1.
652699	The issue of GPD switch crashing is root-caused to inappropriate configuration of the mbedTLS in the GPD framework. The issue is resolved by updating the mbedTLS set up in the framework to use Silabs platform memory manager and adequate heap space is allocated for GPD framework.
656256	A static function has been modified to prevent a memory read overrun when copying a Zigbee Cluster Library attribute value from its internal memory location to a buffer that is sized to accommodate the largest-sized attribute implemented in the application. There was no adverse effect other than the overhead to unnecessarily copy additional unneeded bytes to the buffer.
663784	Fixed that, when returning EMBER_ACCEPT_PACKET_OVERRIDE_SECURITY in the optional incoming packet handler callback, all packets will be treated as if they were received in an encrypted way.
664441	Fixed issue where returning EMBER_DROP_PACKET for a single outgoing NWK or MAC packet in the optional outgoing packet callback led to dropping all following packets of the same respective type.

Fixed in release 6.9.0.0

ID #	Description
299619	The implementation of a callback function in the power-configuration-server plugin, and the invocation of that callback function in the battery-monitor plugin, have been changed to reflect the correct function name emberAfPluginBatteryMonitorDataReadyCallback, in agreement with the definition of that callback function in metadata. Previously, the name of the implemented and invoked callback function omitted "Ready".
317607	Implementation of the ZCL Scenes cluster StoreScene command handling in the scenes plugin is modified to only save the Color Control cluster attribute values of the Color Mode in effect at the time the StoreScene command is executed. Implementation of the ZCL Scenes cluster ViewScene command handling in the scenes plugin is modified to return the full set of attributes for the Color Control cluster extension field set. Attributes that appear earlier in the extension field attribute sequence, even if unused because the corresponding Color Mode is not supported, must be populated in order to present subsequent attributes in their correct position within the sequence. Unused 8-bit and 16-bit attribute values are filled with 0xFF and 0xFFFF respectively.
362133	The default RSSI offset on the EFR32xG1, EFR32xG12, EFR32xG13, EFR32xG14, and EFR32xG21 chips does not compensate for a known internal hardware offset. This offset is chip specific and can be found using the new \ref rail_util_rssi component that will load the correct value for your chip by default when the RSSI Offset component or Hardware Configurator peripheral is enabled. Since the hardware and antenna design can also impact this offset it is recommended that you measure this value for your particular hardware for the best accuracy. This correction is not enabled by default on the chips listed above to prevent changing radio behavior significantly without the user opting into this change. For the EFR32xG22 and future chips the hardware offset is measured and included by default. Please be aware that if any prior CCA token modifications have been made to modify the threshold for CSMA/LBT transmits, adding an RSSI Offset value could reduce or prevent TX.
454936 626009 626735	Z3Light and Z3Switch sample apps encounter a GPIO conflict between LEDs and buttons on module-based radio boards, like BRD4304x, BRD4305x, BRD4306x, BRD4308x, BRD4309x, BRD4311B. The platform layer now detects a conflict and disables (all) buttons in favor of LEDs. The developer can reconfigure buttons and LEDs as desired in Hardware Configurator.
458566	An issue was fixed where the BLE connection may have experienced instability on DMP sleepy applications on series 2 parts.
519731	Reporting cluster plugin no longer send reports for attributes on a disabled endpoint.
521874	Fixed stability issue that prevented the series 2 DMP sleepy light sample application from being able to enter EM2.
522655	The ZigbeeMinimal sample app now has the "Install Code Library" and "Counters" plugins enabled by default.
618634	An issue has been fixed where applications failed to compile due to a missing definition for emGetNetworkIndexForForkedGlobal.
621461	An issue has been fixed where a sleepy end device would fail to go to sleep after trying to unsuccessfully rejoin its parent. After realizing its connectivity with its parent was broken due to unanswered MAC data polls, the end device would attempt to rejoin several times (as specified by the End Device Support plugin). After the final rejoin failure, the end device would be in an EMBER_NETWORK_DOWN state and continue to stay awake, causing an expenditure of energy. With this fix, the device now correctly goes into a sleep mode after the failed rejoin attempt(s).
634740	The ZCL XML for the Color Control cluster was corrected to add missing OptionsMask and OptionsOverride fields to the following cluster commands: Enhanced Move to Hue; Enhanced Move Hue; Enhanced Step Hue; Enhanced Move to Hue and Saturation; and Color Loop Set.
643360	Green Power applications with sink/proxy functionality are now supported on MGM220P devices when built with GCC. Previously, only IAR could be used.
645791	Fixed an issue where phy settings were not respected on xNCP targets.
646739	The logic for handling the trust center policy (Host-NCP) has been fixed to prevent potential issues. For join policy bits: when EZSP_DECISION_ALLOW_JOINS is set, we allow the following decision bits in the order of priority: EZSP_DECISION_DEFER_JOINS > EZSP_DECISION_JOINS_USE_INSTALL_CODE_KEY > EZSP_DECISION_SEND_KEY_IN_CLEAR. For rejoin policy bits: when EZSP_DECISION_ALLOW_UNSECURED_REJOINS is set, we allow the following decision bits in the order of priority: EZSP_DECISION_IGNORE_UNSECURED_REJOINS > EZSP_DECISION_SEND_KEY_IN_CLEAR
649491	Fixed the issue that a number of NCP sample application had both the r22-support and the r22-support-stub libraries enabled at the same time. Also fixed underlying plugin metadata so that enabling both is prevented.

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.si-labs.com/products/software.

ID #	Description	Workaround
60858	Sleepy broadcast payload is sometimes corrupted when relaying to child	No known workaround
82569	RAM corruption (in Packet Buffers) could occur if MAC Filter Match List Size is non-zero and a list of the maximum size is provided to ezspSetValue for EZSP_VALUE_MAC_FILTER_LIST.	No known workaround
106307	Nodetest calChannel command does not wake the radio to work properly.	No known workaround
119939	ZDO IEEE Request's APS ACK proxied by parent incorrectly includes long source address.	No known workaround
135649	Multi-networking can cause APS frame counter confusion between networks.	Use emberAfSecurityInitCallback to add EMBER_NO_FRAME_COUNTER_RESET to EmberInitialSecurityBitmask.
251287	PLATFORM: Lowest current is not achieved during sleep on EFR32xG12, EFR32xG13, and EFR32xG14 devices.	To achieve the lowest current during sleep on EFR32xG12, EFR32xG13, and EFR32xG14 parts, you must turn on voltage scaling. However, the radio will not operate with voltage scaling turned on, so to turn it on you must also make sure to disable it after each wake-up. Furthermore, some resets will not turn off voltage scaling, so please ensure that it is disabled before attempting to turn on the radio. Note that there is a ramp when turning voltage scaling on or off, so enabling this feature may increase the time it takes to go to sleep or wake up.
261670	Harden the ZLL touchlink process to mitigate malicious attacks	No known workaround
266341	Z3 Light sample app has two endpoints that support similar cluster commands, so duplicate responses may be generated for certain commands.	No known workaround
271644	A device that performs a classic join to a legacy ZLL gateway may eventually leave the network on its own initiative.	No known workaround
278063	Smart Energy Tunneling plugins have conflicting treatment/usage of address table index	No known workaround
281832	Green Power Common plugin incorrectly formats groupList and groupListCount parameters of GP Pairing Configuration frame.	No known workaround
289569	Network-creator plugin power level picklist doesn't offer full range of supported values for EFR32	Change the range in the plugin.properties file.
295498	UART reception sometimes drops bytes under heavy load in Zigbee+BLE DMP 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.
331438	Service discovery may time out too quickly in busy networks.	Define EMBER_AF_DISCOVERY_TIMEOUT_QS to customize the timeout period.
338151	Initializing NCP with a low packet buffer count value may cause corrupt packets.	No known workaround

ID #	Description	Workaround
356937	Read/write attribute CLI commands do not support manufacturer-specific ZCL attributes. Some implementations may allow local CLI debug access to display or modify these attributes.	Access the attributes from a remote device in the network via ZCL global Read/WriteAttributes commands.
363162	There is a bug in emberAfAddAddressTableEntry which could allow for duplicate entries in the address table	Under Investigation
387750	Issue with Route Table Request formats on end device.	Under Investigation
398694	Disabling endpoint 2 (Touchlink) in the Z3Light sample app causes high emberRunTask execution time.	Under Investigation
400418	A touchlink initiator cannot link to a non-factory-new end-device target.	Under Investigation
406826	EMHAL: Eeprom Powerdown Plugin may occasionally fail to power down the external flash on the radio board, resulting in higher(about 6 µA) EM2 current.	Reset the radio board.
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
426066	OTA client could reset when it starts to apply the new image if all debug print is disabled.	Modify the function emberAfOtaClientBootloadCallback in souce file "ota-client-policy/ota-client-policy.c", comment the function call of "emberSerialWaitSend".
437502	halInit() is called twice in EmberZNet SPI NCP Host Application.	No known workaround
437704	The OccupiedCoolingSetpoint attribute should be optional by default in Appbuilder.	Modify the "optional" flag from false to true in the OCCUPIED_COOLING_SETPOINT attribute in app/zcl/ha.xml
437817	After EmberZNet 6.6.0, joining and insecurely rejoining children are now subject to a new, temporary timeout EMBER_SHORT_CHILD_TIMEOUT. This defaults to 2 minutes if undefined and should be able to be overridden. However, it doesn't function as expected since defining and changing the value of EMBER_SHORT_CHILD_TIMEOUT doesn't take any effect. The short temporary timeout for the joining device will always stay as 2 minutes.	No known workaround
438993	Certain IRQ Pin/Port settings do not allow wake on interrupt in some EM3xx parts.	No known workaround
439062	When receiving a Network Status command as a broadcast, the command frame is neither retransmitted nor added to the broadcast transaction table.	No known workaround
442664	In a dense network with many devices joining simultaneously, a packet buffer assert is sometimes seen when collecting beacons during network steering.	No known workaround
446827	There is a potential for the code to get stuck in an infinite loop if it is unable to write to the edge detect setting of the GPIO in function edgeGpioDevice in file spi-protocol-linux.c.	If using SPI Host, increment the loopCount variable in the while loop.
454935	When the Z3Switch sample app is changed to be a sleepy end device on EFR32MG21, it may reset repeatedly.	Press Reset button, power cycle or disconnect debug interface.

ID #	Description	Workaround
456350	"emberAfPluginIasZoneClientReadAttributesResponseCallback" in "ias-zone-client.c" incorrectly sets the type of "zoneStatus" and "zoneType" attributes to uint8_t. The correct type should be uint16_t.	Modify the type of these two attributes to "uint16_t" in "emberAfPluginIasZoneClientReadAttributesResponseCallback".
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".
468581	ZCL attribute tokens creator codes are likely to change if you add or remove one or more attributes. For instance, if you add an attribute whose cluster ID or attribute ID is not the largest numerically, then this attribute gets inserted into a list of creator codes and makes all creator codes after it to be different (shifted).	Use the script at https://github.com/SiliconLabs/IoT_Utility_Scripts/tree/master/token_preserver to fix this issue.
469704	On EFR32XG2x there is a known issue with the debug interface where a pin reset, connection to a debugger or flashing an image on device could cause a pull up on DBG_TDI and DBG_TDO pins which cannot be reliably disabled in software. On BRD4182A, this could cause the device to be unable to communicate with the Serial flash. As a result a reset loop is possible when a bootloader is used. A pin reset is needed to get the device out of the reset loop. A related software bug that caused a reset loop for applications with application bootloaders is fixed.	Avoid a pin reset of EFR32XG2X when a debugger is attached. If a pin reset is necessary, avoid using PA3 and PA4, or use JTAG instead of SWD.
474616	EEPROM POWERDOWN plugin can't compile on MG22.	No known workaround
475287	The DCDC settings in the Hardware Configurator do not take effect on EFR32MG22 Zigbee SoC samples.	Call the following code in emberAfMainInitCallback() ```\n#if BSP_DCDC_PRESENT\nEMU_DCDCInit_TypeDef dcdcInit = BSP_DCDC_INIT;\n#if HAL_DCDC_BYPASS\ndcdcInit.dcdcMode = emuDcdcMode_Bypass;\n#endif\nEMU_DCDCInit(&dcdcInit);\n#else\nEMU_DCDCPowerOff();\n#endif\n```
479521	Building Zigbee SoC images with the Smart energy token optimization feature enabled and using the Simplicity Studio 5 IDE will not link the correct stub libraries.	The path to the stub libraries in the .ewp file need to be corrected manually.
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

ID #	Description	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.
481618	The "Network Open Time" option of the Network Creator Security plugin may not work as expected when you open network if the time does not match the transient key timeout.	Set the Network Open time to the same value as the Transient Key Timeout.
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.
488977	OTA of EFR32xG2x devices will fail if using Slot Manager with Gecko bootloader 1.10 or newer.	Set the macro "SLOT_MANAGER_VERIFICATION_CONTEXT_SIZE" to "BOOTLOADER_STORAGE_VERIFICATION_CONTEXT_SIZE" in \util\plugin\slot-manager\slot-manager.h. This must be modified in the SDK directly.
494873	The sleepy end device can't rejoin to its previous parent with the rejoining API when the parent's child table is full.	Reset the sleepy end device.
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 attempt to join. This mode can be forced by 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
498094	In function checkForReportingConfig() in metering-server.c, the second input parameter of the invoked function emberAfContainsServer() incorrectly references the attribute ID instead of the cluster ID.	Change the 2nd input parameter from the attribute ID (ZCL_CURRENT_SUMMATION_DELIVERED_ATTRIBUTE_ID) to the cluster ID (ZCL_SIMPLE_METERING_CLUSTER_ID).
519905	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
521706	A duplicated attribute ID is assigned in the altConsumptionMonthAttrIds[] array of the gas-proxy-funxtion plugins in gpf-structured-data.c.	Change the second ZCL_PREVIOUS_MONTH6_ALTERNATIVE_CONSUMPTION_DELIVERED_ATTRIBUTE_ID to ZCL_PREVIOUS_MONTH7_ALTERNATIVE_CONSUMPTION_DELIVERED_ATTRIBUTE_ID.
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.
621144	GP on/off switch example cannot be compiled for the BRD4183A board.	The sample has to be manually modified to use only one button.

ID #	Description	Workaround

621532	A few seconds after NCP-SPI goes to sleep, it will wake-up once and go to sleep again.	Disable the CC1 channel interrupt of RTCC in the callbacks.c file by using the EM23PresleepHook
		`#include "em_emu.h"#include "em_rtcc.h"void EMU_EM23PresleepHook(void)`
		`{`
		`RTCC->CC[1].CTRL &= ~_RTCC_CC_CTRL_MODE_MASK;`
		`RTCC_IntDisable(RTCC_IF_CC1);`
		`RTCC_IntClear(RTCC_IF_CC1);`
		`}`

623755	**The Dynamic Multiprotocol Light (DMP) sample application does not currently work on boards without a connection to the LCD display on the WSTK. This includes any custom boards and Silicon Labs boards like BRD4309A/B.**	**DMP can still be used on these boards, as this is only a limitation of the sample application.**
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.
634828	**Certain messages with invalid Source Address (0xFFFE) trigger assert(0) in the application. In Host-NCP model the issue terminates the Host application execution.**	**Modify the securityAddToAddressCache() in SoC model. The function source is not available in the NCP model, hence the emberPacketHandoffIncoming() function should be used to filter out invalid packets.**
643130	**Sleepy end device may keep awake for a while if the "minimal wake time" option of plugin "idle/sleep" is set to 0.**	**Disable debug print.**
648861	**Routers using optimized scans during network steering will "miss" beacons that are broadcast by nodes that are open but advertise no end-device capacity that is, their child table is full).**	**No known workaround.**
648906	**emberChildId API was accidentally removed in EmberZNet 6.8.0.2.**	**Call sl_mac_child_short_id instead.**
652833	**Host-NCP based nodes using optimized scans during network steering will "miss" beacons that are broadcast by nodes that are open.**	**No known workaround.**
659010	**emberChildIndex API was accidentally removed in EmberZNet 6.8.0.2.**	**Call sl_mac_child_index instead.**
661214	**Upgrading NCP from the host side will fail if the communication port between host and NCP is not USART0.**	**Use USART0 as the communication port.**

5 Deprecated Items

Advanced Notice

Zigbee support – The upcoming Zigbee R23 specification will not be supported on any devices matching the following criteria:

- All EM35x devices
- Any devices with 256 kB flash or less [All wireless MCU families]

Reason: The Zigbee R23 specification will lead to increased flash requirements and introduce new security requirements that these devices cannot adequately support. In preparation for that, support for these devices has been removed in this release. Customers are advised to start any new Zigbee developments using EFR32 series devices that exceed the criteria as listed above.

Maintenance Period: Critical bug fixes and security patches on the prior 6.8.x release will continue to be made available for the lifetime of EM35xx series and wireless MCU devices with less than 256 kB, as specified by the wireless longevity commitment https://www.si-labs.com/wireless/longevity-commitment

6 Removed Items

Removed in release 6.9.0.0

All support for **EM35x devices** is removed. Additionally, **Lightweight IP** and **Low-Voltage Shutdown** plugins are removed.

7 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 UG103.02: Zigbee Fundamentals.

If you are a first-time user, see QSG106: Getting Started with EmberZNet PRO, for instructions on configuring your development environment, building and flashing a sample application, and documentation references pointing to next steps.

7.1 Installation and Use

Use the EmberZNet SDK v6.8.n with the Silicon Labs Simplicity Studio 5 development platform. Installation instructions are provided in the Simplicity Studio 5 online 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.

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/.

7.2 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 Legal

8.1 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.

8.2 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.