

# ***Bluetooth Smart Software 2.4.0 build 2328***

<b>Software Version</b>	2.4.0 build 2328
<b>Software Status</b>	GA
<b>Release Date</b>	9th of June, 2017
<b>Affected Products</b>	BGM11x <i>Bluetooth</i> Smart Modules BGM12x <i>Bluetooth</i> Smart Modules EFR32[B M]G1 EFR32[B M]G12 EFR32[B M]G13

## **Changes: 2.4.0 (build 2328) compared to 2.3.2 (build 2263)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
EFR32[B M]G13	Support for EFR32BG13 and EFR32MG13 product families added.
BGM11S	Support for BGM11S <i>Bluetooth</i> Smart Module added.
Long Range	<i>Bluetooth</i> 5 Long Range support for EFR32[B M]13 product family.
PLFRCO	PLFRCO support for EFR32[B M]G13 product family.
Privacy 1.2 for peripheral	<i>Bluetooth</i> 4.2 Privacy 1.2 for peripheral is now supported for random addressing.
Polymorphic GATT DB	This feature can be used to dynamically show or hide GATT features.
GCC compiler support	This SDK release contains GA level support for GCC compiler version 4.9.3.
CSA#2	<i>Bluetooth</i> 5 channel selection algorithm supported.
Bonding handling algorithm	There is a new algorithm to handle bondings in a way that flash usage is minimized.

<b>Feature</b>	<b>Explanation</b>
cmd_gatt_prepare_characteristic_value_reliable_write()	This command can be used to add a characteristic value to the write queue of a remote GATT server and verify if the value was correctly received by the server.
cmd_gatt_server_set_capabilities()	This command can be used to set which capabilities should be enabled in the local GATT database.
cmd_le_gap_set_privacy_mode()	This command can be used to enable or disable privacy feature on all GAP roles.
cmd_system_set_bt_address()	This command can be used to set the Bluetooth public address.
cmd_system_set_device_name()	This command can be used to set the device name.
cmd_user_message_to_target()	This command can be used by an NCP host to send a message to the target application on the device. Part of a new API class called user.
evt_user_message_to_host event	This event can be used by the target application on the device to send a message to NCP host. Part of a new API class called user.

## Notes

<b>Note</b>	<b>Explanation</b>
Mobile applications	Silicon Labs Blue Gecko application with OTA update capability is now available for both Android and iOS devices. Downloadable via Play Store and App Store.
BGScript for EFR32[B M]G1	BGScript is no longer supported for any product families.
Studio version update	This SDK is compliant with Simplicity Studio 4.13 or newer.
Simplicity Commander	This SDK is compliant with Simplicity Commander 0.24.1 or newer.
BGAPI HW, flash and utilities command removal	The following BGAPI commands are removed in this release: <ul style="list-style-type: none"> <li>• cmd_hardware_config_adc_reference()</li> <li>• cmd_hardware_configure_gpio()</li> <li>• cmd_hardware_read_adc()</li> </ul>

Note	Explanation
	<ul style="list-style-type: none"> <li>• cmd_hardware_read_adc_channel()</li> <li>• cmd_hardware_read_gpio()</li> <li>• cmd_hardware_read_i2c()</li> <li>• cmd_hardware_set_uart_configuration()</li> <li>• cmd_hardware_stop_i2c()</li> <li>• cmd_hardware_write_gpio()</li> <li>• cmd_hardware_write_i2c()</li> <li>• cmd_util_atoi()</li> <li>• cmd_util_itoa()</li> </ul> <p>The following BGAPI events will be deprecated in the next major release:</p> <ul style="list-style-type: none"> <li>• evt_hardware_interrupt</li> </ul> <p>The following BGAPI enumerations will be deprecated in the next major release:</p> <ul style="list-style-type: none"> <li>• enum_hardware_adc_channel</li> <li>• enum_hardware_adc_reference</li> <li>• enum_hardware_gpio_mode</li> <li>• enum_hardware_uartparity</li> </ul>
cmd_gatt_server_set_database()	This command is now deprecated and will be removed in future releases.
enum_le_connection_security	Extended with le_connection_mode1_level4 to be used for authenticated secure connections pairing with encryption using a 128-bit strength encryption key.
IAR libraries for building <i>Bluetooth</i> stack	<p><i>Bluetooth</i> SDK now includes the following libraries for IAR projects:</p> <ul style="list-style-type: none"> <li>• bgapi.a</li> <li>• libbluetooth.a</li> <li>• libembedtls.a</li> <li>• librail.a</li> <li>• libbootloader_api.a</li> </ul> <p>Note that in-place OTA DFU will not work when the stack is built using these libraries.</p>

## Quality Improvements

API documentation improved

General documentation updates

Example applications and demos updated in the SDK

Improvements and bugs fixes in Visual GATT Editor

Continuously modulated RF signal support added

Memory handling robustness improvements for GATT operations  
 HW initialization simplified  
 PTI decoders improved for *Bluetooth* usage  
 OTA DFU throughput improvements  
 BGAPI command handling optimized and made faster  
 BGTool and bgbuild tools updated  
 Increased encrypted PDU size for over the air packets to 160 bytes  
 Gecko Bootloader version is now reported in evt\_system\_boot event (when legacy bootloaders are used, version is reported as 0)  
 Improvements in Switched Multi-Protocol use cases, demos and examples  
 BTDS plug-ins updated  
 BGAPI command parsing robustness improved  
 iOS and Android interoperability improved  
 Bonding handling robustness improvements  
 LLCP operations handling improved

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
1248	Prepare write request	Prepare write request does not fail with gatt_procedure_completed event if data is corrupted.

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
1487	Bonding with 8 slaves	8th consecutive bonding by master device fails with multiple slaves.

ID	Issue	Explanation
1814	IAR and GCC compiler	One should not have both IAR and GCC toolchains active in Simplicity Studio when a new project is created. Otherwise the toolchain is automatically set to IAR, even if GCC was originally chosen.
1835	GCC breakpoints	With certain events, GCC breakpoints cannot be set.
1992	BTDS plug-ins	BTDS plug-ins do not handle multiple instances of the same service.
2220	DTM parameters	DTM tests are not run correctly if invalid parameters (like unsupported PHY) are given to test commands.
2350	Long Range connection interval	Coded PHY minimum connection interval is currently limited and documented to 40 ms, but the software does not check this.
2364	Long Range TX packets	Coded PHY TX packets are over-deviating, causing possible IOP issues.

# ***Bluetooth Smart Software 2.3.2 build 2263***

<b>Software Version</b>	2.3.2 build 2263
<b>Software Status</b>	GA
<b>Release Date</b>	26th of May, 2017
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module BGM121 <i>Bluetooth</i> Smart Module EFR32BG1 Blue Gecko EFR32BG12 Blue Gecko EFR32MG1 Mighty Gecko EFR32MG12 Mighty Gecko

## **Changes: 2.3.2 (build 2263) compared to 2.3.1 (build 2044)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
-	-

### **Notes**

<b>Note</b>	<b>Explanation</b>
-	-

### **Quality Improvements**

API documentation improved

Interrupting OTA DFU does not brick the device anymore

*Bluetooth* 5 connection event is no longer raised when legacy API is used to open the connection

Empty data buffer handling fixed in UART

RTCC overflow fixed, enabling also multiple soft timers to work correctly

Stack initialization no longer fails because of RTCC counter values

Stack no longer freezes when calling `cmd_gatt_set_characteristic_notification()` when the remote GATT server has been disconnected

Pairing timeout with Mac OS fixed by adding IRK for local device so bonded device can resolve the private address

Current consumption reduced when a connection is closed immediately after opening it  
BGTool fixed to build BGScript examples correctly

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
-	-	-

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
1248	Prepare write request	Prepare write request does not fail with gatt_prodecure_completed event if data is corrupted.
1487	Bonding with 8 slaves	8th consecutive bonding by master device fails with multiple slaves.
1814	IAR and GCC compiler	One should not have both IAR and GCC toolchains active in Simplicity Studio when a new project is created. Otherwise the toolchain is automatically set to IAR, even if GCC was originally chosen.

# ***Bluetooth Smart Software 2.3.1 build 2044***

<b>Software Version</b>	2.3.1 build 2044
<b>Software Status</b>	GA
<b>Release Date</b>	10th of April, 2017
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module BGM121 <i>Bluetooth</i> Smart Module EFR32BG1 Blue Gecko EFR32BG12 Blue Gecko EFR32MG1 Mighty Gecko EFR32MG12 Mighty Gecko

## **Changes: 2.3.1 (build 2044) compared to 2.3.0 (build 1981)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
-	-

### **Notes**

<b>Note</b>	<b>Explanation</b>
-	-

### **Quality Improvements**

Documentation updates

Thunderboard Sense example supports GCC as well

Fixed device reset which was caused by protocol timer wrap-around

Fixed device reset which was caused by overlapping DCDC settings when using high TX power

Fixed DTM RX issue for EFR32[B|M]G12 products

Fixed RTCC timer overflow issue, which caused `cmd_hardware_get_time()` command not to work correctly

Fixed in-place OTA feature to work correctly with secure boot and firmware image signing

Fixed BTDS plug-ins for Simplicity Studio and IAR projects



Fixed OTA DFU for EFR32[B|M]G12 products with Gecko Bootloader (both with security enabled and with security disabled)

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
-	-	-

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
1248	Prepare write request	Prepare write request does not fail with gatt_prodecure_completed event if data is corrupted.
1487	Bonding with 8 slaves	8th consecutive bonding by master device fails with multiple slaves.
1814	IAR and GCC compiler	One should not have both IAR and GCC toolchains active in Simplicity Studio when a new project is created. Otherwise the toolchain is automatically set to IAR, even if GCC was originally chosen.

# Bluetooth Smart Software 2.3.0 build 1981

<b>Software Version</b>	2.3.0 build 1981
<b>Software Status</b>	GA
<b>Release Date</b>	10th of March, 2017
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module BGM121 <i>Bluetooth</i> Smart Module EFR32BG1 Blue Gecko EFR32BG12 Blue Gecko EFR32MG1 Mighty Gecko EFR32MG12 Mighty Gecko

## Changes: 2.3.0 (build 1981) compared to 2.1.1 (build 1691)

### New Features

<b>Feature</b>	<b>Explanation</b>
EFR32[B M]G12	Support for EFR32BG12 and EFR32MG12 product families with maximum 256 kB of RAM and maximum 1024 kB of flash added.
2M PHY	Implementation for <i>Bluetooth</i> 5 2M PHY feature added. Supported in EFR32BG12 and EFR32MG12 parts.
Switched multiprotocol support	This SDK supports switched multiprotocol use cases with EFR32[B M]G12 parts, enabling switching between Bluetooth and mesh stacks at boot time and allowing data exchange between the stacks. For more information, please see UG267: Multiprotocol User Guide.
BGAPI command size	BGAPI command size is fixed to the maximum size of 256 bytes in stand-alone and NCP modes.
ATT MTU size	ATT MTU maximum size has been increased to 250 bytes.

<b>Feature</b>	<b>Explanation</b>
GCC compiler support	This SDK release contains Beta level support for GCC compiler.
Advertisement Sets	This release contains support for <i>Bluetooth 5</i> Advertisement Sets feature.
cmd_le_gap_bt5_set_adv_data()	This command is the same as cmd_le_gap_set_adv_data, but it has been extended to support <i>Bluetooth 5</i> advertisement sets feature.
cmd_le_gap_bt5_set_adv_parameters()	This command is the same as cmd_le_gap_set_adv_parameters, but it has been extended to support <i>Bluetooth 5</i> advertisement sets feature.
cmd_le_gap_bt5_set_mode()	This command is the same as cmd_le_gap_set_mode, but it has been extended to support <i>Bluetooth 5</i> advertisement sets feature.
evt_le_connection_bt5_opened	This event is the same as evt_le_connection_opened, but it has been extended to support <i>Bluetooth 5</i> advertisement sets feature.
evt_le_gap_scan_request	This event reports any scan request received in advertisement mode if scan request reporting is enabled.
enum_le_gap_adv_address_type	Identity and non-resolvable advertisement address types added.
cmd_system_halt()	This command forces radio to idle state and allows device to sleep. Advertising, scanning, connections and software timers are also halted.

## Notes

<b>Note</b>	<b>Explanation</b>
Studio version update	This SDK is compliant with Simplicity Studio 4.11 or newer.

Note	Explanation
Simplicity Commander	This SDK is compliant with Simplicity Commander 0.22.1 or newer.
Gecko Bootloader	This SDK contains support for the new Gecko Bootloader, supporting also secure DFU. For Bluetooth SDK, Gecko Bootloader is the only supported bootloader for EFR32[B M]G12 product families for now on. For EFR32[B M]G1 product families, the legacy OTA and UART bootloaders are also supported still. More information about the new bootloader can be found from UG266: Silicon Labs Gecko Bootloader User Guide.
bgapi.a	All applications using BGAPI must now be linked with bgapi.a library.
DTM extensions	<p>New parameter phy added to the following DTM commands:</p> <ul style="list-style-type: none"> <li>• test_dtm_rx(channel) =&gt; test_dtm_rx(channel, phy)</li> <li>• test_dtm_tx(packet_type, length, channel) =&gt; test_dtm_tx(packet_type, length, channel, phy)</li> </ul> <p>Using test_phy_1m as the phy parameter value will produce the same behavior as before.</p>
Crypto cores	EFR32[B M]G12 product family supports two crypto cores. Core 0 is always used by the <i>Bluetooth</i> stack, leaving core 1 for the application.
BRD4156A and BRD4157B	These radio boards are no longer supported by this SDK. These are replaced by BRD4164A and BRD4163A.
BGScript with EFR32[B M]G12	BGScript is no longer supported in these product families.
BGScript changes for EFR32[B M]G1	<p>The following commands and events have changed to comply with the new features and improvements, and user applications must be changed accordingly.</p> <ul style="list-style-type: none"> <li>• sent_len parameter added to the response message: <ul style="list-style-type: none"> <li>○ gatt_prepare_characteristic_value_write(connection, characteristic, offset, value_len, value_data)(result, sent_len)</li> <li>○ gatt_write_characteristic_value_without_response(connection, characteristic, value_len, value_data)(result, sent_len)</li> <li>○ gatt_server_send_user_read_response(connection, characteristic, att_errorcode, value_len, value_data)(result, sent_len)</li> <li>○ gatt_server_send_characteristic_notification(connection, characteristic, value_len, value_data)(result, sent_len)</li> </ul> </li> <li>• max_mtu parameter added to the response message: <ul style="list-style-type: none"> <li>○ gatt_set_max_mtu(max_mtu)(result, max_mtu)</li> </ul> </li> </ul>

Note	Explanation
	<ul style="list-style-type: none"> <li>• txsize (maximum Data Channel PDU payload size the controller can send in an air packet) parameter has been added to le_connection_parameter event <ul style="list-style-type: none"> <li>○ le_connection_parameters(connection, interval, latency, timeout, security_mode, txsize)</li> </ul> </li> </ul>
BGScript deprecation	BGScript support, also in EFR32[B M]G1 products, will be discontinued in the next major release.
BGAPI HW, flash and utilities command deprecation	<p>The following BGAPI commands will be deprecated in the next major release:</p> <ul style="list-style-type: none"> <li>• cmd_flash_ps_dump()</li> <li>• cmd_flash_ps_erase_all()</li> <li>• cmd_flash_ps_save()</li> <li>• cmd_flash_ps_load()</li> <li>• cmd_flash_ps_erase()</li> <li>• cmd_hardware_config_adc_reference()</li> <li>• cmd_hardware_configure_gpio()</li> <li>• cmd_hardware_enable_dcdc()</li> <li>• cmd_hardware_get_time()</li> <li>• cmd_hardware_read_adc()</li> <li>• cmd_hardware_read_adc_channel()</li> <li>• cmd_hardware_read_gpio()</li> <li>• cmd_hardware_read_i2c()</li> <li>• cmd_hardware_set_uart_configuration()</li> <li>• cmd_hardware_stop_i2c()</li> <li>• cmd_hardware_write_gpio()</li> <li>• cmd_hardware_write_i2c()</li> <li>• cmd_util_atoi()</li> <li>• cmd_util_itoa()</li> </ul> <p>The following BGAPI events will be deprecated in the next major release:</p> <ul style="list-style-type: none"> <li>• evt_hardware_interrupt</li> </ul> <p>The following BGAPI enumerations will be deprecated in the next major release:</p> <ul style="list-style-type: none"> <li>• enum_hardware_adc_channel</li> <li>• enum_hardware_adc_reference</li> <li>• enum_hardware_gpio_mode</li> <li>• enum_hardware_uartparity</li> </ul>

## Quality Improvements

Documentation updates  
 Example applications and demos ported also to the new products  
 Link layer packet size increased to 128 bytes  
 LEUART functionality verified  
 HCI packet handling improved  
 When using OTA DFU, firmware size is pre-checked prior to writing it to flash  
 Thunderboard Sense demo added to the SDK  
 Data corruption prevented in BGAPI by making the API level data checks more robust  
 GATT local database now supports attribute value and user-handled characteristic length up to 512 bytes  
 GATT compiler and parser, handling gatt.xml files, have been improved  
 DTM updated to comply with new *Bluetooth 5* features  
 Maximum number of stored bondings have been increased to 14  
 Memory overflows prevented in internal memory handling  
 Connection closed events are no longer lost, even if the connection is lost in the middle of bonding  
 Scan response handling improved  
 GATT server memory overflow fixed  
 ATT level buffer handling improved  
 Windows 10 interoperability improved  
 gatt\_prepare\_characteristic\_value\_write command does not anymore silently discard too long data  
 BGTool updated to comply with new *Bluetooth 5* features  
 Data size is now reported within le\_connection\_parameters event for better application level throughput optimization  
 J-Link interface changed from JTAG to SWD for the legacy bootloader IAR project to enable bootloader code debugging  
 OTA DFU can now utilize larger ATT MTU size for better throughput  
 Visual GATT Editor updated  
 Security Manager robustness improvements

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes.
1431	gap_set_mode()	The command does not return an error if the device is being set to connectable mode and the maximum number of connections has been reached.

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
1432	le_gap_open()	The command stalls if device is advertising as connectable and has reached max_connections – 1.
1445	ATT MTU size	To avoid a possible memory overflow in BGAPI, the maximum ATT MTU size should be limited to 121 bytes.

## **Known Issues in this Release**

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
1248	Prepare write request	Prepare write request does not fail with gatt_procedure_completed event if data is corrupted.
1487	Bonding with 8 slaves	8th consecutive bonding by master device fails with multiple slaves.
1814	IAR and GCC compiler	One should not have both IAR and GCC toolchains active in Simplicity Studio when a new project is created. Otherwise the toolchain is automatically set to IAR, even if GCC was originally chosen.

# ***Bluetooth Smart Software 2.1.1 build 1691***

<b>Software Version</b>	2.1.1 build 1691
<b>Software Status</b>	GA
<b>Release Date</b>	21st of December, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module BGM121 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 2.1.1 (build 1691) compared to 2.1.0 (build 1638)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
-	-

### **Notes**

<b>Note</b>	<b>Explanation</b>
-	-

### **Quality Improvements**

Fixed a memory leak in pairing procedure using secure connections  
Fixed a firmware update issue, which prevented updating the software from 2.0.x version to 2.1.x version  
Fixed BGTool Commander path in OS X version of the SDK  
Removed obsolete 2.0.x SDK documentation

### **Fixed Known Issues since the previous Release**



ID	Issue	Explanation
-	-	-

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes. The limitation is now properly documented, but the root cause has not been fixed yet in this release.
1248	Prepare write request	Prepare write request does not fail with gatt_procedure_completed event if data is corrupted.
1431	gap_set_mode()	The command does not return an error if the device is being set to connectable mode and the maximum number of connections has been reached.
1432	le_gap_open()	The command stalls if device is advertising as connectable and has reached max_connections - 1.
1445	ATT MTU size	To avoid a possible memory overflow in BGAPI, the maximum ATT MTU size should be limited to 121 bytes.

# ***Bluetooth Smart Software 2.0.3 build 1690***

<b>Software Version</b>	2.0.3 build 1690
<b>Software Status</b>	GA
<b>Release Date</b>	21st of December, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module BGM121 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 2.0.3 (build 1690) compared to 2.0.2 (build 1604)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
-	-

### **Notes**

<b>Note</b>	<b>Explanation</b>
-	-

### **Quality Improvements**

Fixed a memory leak in pairing procedure using secure connections

Fixed a firmware update issue, which prevented updating the software from 2.0.x version to 2.1.x version

### **Fixed Known Issues since the previous Release**

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
-	-	-

### **Known Issues in this Release**

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes. The limitation is now properly documented, but the root cause has not been fixed yet in this release.

# *Bluetooth Smart Software 2.1.0 build 1638*

<b>Software Version</b>	2.1.0 build 1638
<b>Software Status</b>	GA
<b>Release Date</b>	5th of December, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module BGM121 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 2.1.0 (build 1638) compared to 2.0.0 (build 1391)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
ATT MTU size increase	Attribute Protocol MTU maximum size is now 126 bytes.
Graphical GATT Editor	This new tool helps to automatically generate a GATT database based on user selections. It supports all <i>Bluetooth</i> profiles, services and characteristics.
Apple HomeKit	This SDK has the necessary enablers in place to support Apple HomeKit R7 compliant software development. Please see <a href="http://www.silabs.com/homekit">http://www.silabs.com/homekit</a> to get started.
OOB pairing	Out of band pairing is now supported for secure connections.

### **Notes**

<b>Note</b>	<b>Explanation</b>
Studio version update	SDK is compliant with Simplicity Studio 4.06 or newer.
Bootloader	Bootloader has been updated. Details of the changes are described in a Knowledge Base article: <a href="http://community.silabs.com/t5/Bluetooth-Wi-Fi-Knowledge-Base/Bootloader-changes-in-BLE-SDK/ta-p/183640">http://community.silabs.com/t5/Bluetooth-Wi-Fi-Knowledge-Base/Bootloader-changes-in-BLE-SDK/ta-p/183640</a>

Note	Explanation
IAR version	In <i>Bluetooth C</i> development, one should have IAR version 7.80.2 or newer in use.
Migration guide	For easier migration from 2.0.x SDK to this one, there is a Knowledge Base article available: <a href="http://community.silabs.com/t5/Bluetooth-Wi-Fi-Knowledge-Base/Bluetooth-Smart-SDK-Migration-Guide-From-V2-0-1-to-V2-1-x/ta-p/183921">http://community.silabs.com/t5/Bluetooth-Wi-Fi-Knowledge-Base/Bluetooth-Smart-SDK-Migration-Guide-From-V2-0-1-to-V2-1-x/ta-p/183921</a>

## Quality Improvements

Fix for maximum input signal level (TP/RCV-LE/CA/BV-06-C) test by adjusting automatic gain control levels of the PA

Thunderboard React application improved

Simplicity Commander updated to 0.17.3 version, which generates properly formatted EBL firmware update files

Thunderboard Sense software example updated

Random number generator is now initialized properly at boot time

DTM fixed to also generate unmodulated carrier properly using the test command

BGTool updated

BTDS plug-ins updated

CRC check added to OTA firmware update

UART bootloader error reporting improved

DTM example application added

Documentation updated

Added AN1045: Bluetooth Over-the-Air Device Firmware Update Application Note

Length parameter calculated correctly for commands in NCP mode

BGAPI command size maximum (128 bytes) is now the same for SoC and NCP modes

BGAPI command payload overflow does not cause a crash anymore

DTM does not stop listening for new packets after 4 seconds anymore

Fixed waking up from EM4H mode by fixing DFU update request checking

Fixed Thermometer example for BGM121

Fixed OTA image size checking

BGAPI command handling improved to notify the user if the number of available buffers is too small

API documentation improved and updated

MITM protection works now also when slave device requests it

Slave device behavior fixed, when master device loses bonding

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
-	-	-

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes. The limitation is now properly documented, but the root cause has not been fixed yet in this release.
1248	Prepare write request	Prepare write request does not fail with gatt_procedure_completed event if data is corrupted.
1431	gap_set_mode()	The command does not return an error if the device is being set to connectable mode and the maximum number of connections has been reached.
1432	le_gap_open()	The command stalls if device is advertising as connectable and has reached max_connections - 1.
1445	ATT MTU size	To avoid a possible memory overflow in BGAPI, the maximum ATT MTU size should be limited to 121 bytes.

# ***Bluetooth Smart Software 2.0.2 build 1604***

<b>Software Version</b>	2.0.2 build 1604
<b>Software Status</b>	GA
<b>Release Date</b>	25th of November, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 2.0.2 (build 1604) compared to 2.0.1 (build 1485)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
-	-

### **Notes**

<b>Note</b>	<b>Explanation</b>
-	-

### **Quality Improvements**

Fix for maximum input signal level (TP/RCV-LE/CA/BV-06-C) test by adjusting automatic gain control levels of the PA.

Thunderboard React application improved.

### **Fixed Known Issues since the previous Release**

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
-	-	-

### **Known Issues in this Release**

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes. The limitation is now properly documented, but the root cause has not been fixed yet in this release.



# ***Bluetooth Smart Software 2.0.1 build 1485***

<b>Software Version</b>	2.0.1 build 1485
<b>Software Status</b>	GA
<b>Release Date</b>	15th of October, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 2.0.1 (build 1485) compared to 2.0.0 (build 1391)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
-	-

### **Notes**

<b>Note</b>	<b>Explanation</b>
-	-

### **Quality Improvements**

Simplicity Commander updated to 0.17.3 version, which generates properly formatted EBL firmware update files. Workaround for the original issue in 2.0.0 GA is described in <http://community.silabs.com/t5/Bluetooth-Wi-Fi-Knowledge-Base/Testing-UART-DFU-with-BLE-SDK-2-0-0-1391/ta-p/179823>.

Thunderboard Sense software example updated

Random number generator is now initialized properly at boot time

DTM fixed to also generate unmodulated carrier properly using the test command

### **Fixed Known Issues since the previous Release**

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
-	-	-

## Known Issues in this Release

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes. The limitation is now properly documented, but the root cause has not been fixed yet in this release.

# Bluetooth Smart Software 2.0.0 build 1391

<b>Software Version</b>	2.0.0 build 1391
<b>Software Status</b>	GA
<b>Release Date</b>	16th of September, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## Changes: 2.0.0 (build 1391) compared to 2.0.0 (build 1353)

### New Features

Feature	Explanation
-	-

### Notes

Note	Explanation
Version 1.0.x	Version 2.0.0 is not backwards compatible with 1.0.x versions, meaning that an application written with 1.0.x SDK, will not work without modifications in 2.0.0 SDK and vice versa. Additionally, one cannot perform DFU, either over UART nor OTA, between the versions 1.0.x and 2.0.0.
BGM111v1.0	The first HW version (v1.0) of the BGM111 Bluetooth module is no longer supported in Simplicity Studio v4.

### Quality Improvements

Examples and demos updated

Documentation updated

BGTool and bgbuild tools updated

SW flow control added to UART DFU functionality

DFU robustness improved by fixing buffer overflow situations

DFU CRC checksum calculation added

GATT parser in bgbuild warns the user if <<gatt service>> is not the first defined service

Bootloader IAR example application added to SDK  
Data packet handling robustness improved to avoid possible deadlock situations in memory buffer allocation

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
-	-	-

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
679	HW Configurator	HW Configurator in Simplicity Studio v4 does not currently allow changing some of the HW settings like for example DCDC, LFXO, and CTUNE values.
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes. The limitation is now properly documented, but the root cause has not been fixed yet in this release.

# ***Bluetooth Smart Software 2.0.0 build 1353***

<b>Software Version</b>	2.0.0 build 1353
<b>Software Status</b>	Beta
<b>Release Date</b>	2nd of September, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 2.0.0 (build 1353) compared to 1.0.4 (build 1073)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
Secure Connections	Support for LE Secure Connections according to <i>Bluetooth</i> specification 4.2. Including ECDH key exchange and passkey comparison with MITM. When communicating with legacy devices, the implementation will fall back to 4.0 pairing.
Packet Extensions	First implementation for increasing the link layer packet size according to <i>Bluetooth</i> specification 4.2. This release supports link layer packet size up to 50 bytes instead of the default 23 bytes.
Dual Topology	Support for Dual Topology according to <i>Bluetooth</i> specification 4.1. This enables EFR32 to be a slave and master device at the same time.
Simplicity Studio v4	This build and corresponding SDK is compatible with Simplicity Studio v4. This enables for example having multiple SDKs installed at the same time, and creating for example IAR and BGScript projects in a single SDK. Earlier Simplicity Studio version 3 is no longer supported. Also former

Feature	Explanation
	“Blue Gecko Bluetooth Smart BGScript and IAR SDK 1.0.x” is discontinued.
BTDS plug-ins	This SDK build includes plug-ins, which can be used to quickly and efficiently create consistent Bluetooth profiles and applications using <i>Bluetooth Developer Studio</i> tool, developed by <i>Bluetooth SIG</i> .
sm_bonding_confirm()	This command is used to accept or reject a bonding request. A new bonding request is indicated by a corresponding sm_confirm_bonding event.
sm_passkey_confirm()	This command is used to accept or reject a reported confirm value. Corresponding event to indicate the request to display the passkey to the user and for the user to confirm the displayed passkey is sm_confirm_passkey.
sm_set_debug_mode()	This command is used to set Security Manager into debug mode, enabling encrypted packets to be opened with a <i>Bluetooth</i> protocol analyzer as the secure connections are using debug keys for bonding.
dfu_boot_failure event	This event indicates that there has been an error in bootloader and the reason is given as an error code.
gatt_read_characteristic_value_from_offset()	This command can be used to read a partial characteristic value from a remote GATT database with specified offset and maximum length.

## Notes

Note	Explanation
IAR version	In <i>Bluetooth C</i> development, one should have IAR version 7.60 or newer in use.

Note	Explanation
Bootloader	Bootloader library is now separated from the stack library, and the bootloader itself has been updated as well. Application now needs to link the new bootloader library as well as include aat.h file. Please see UG136 document for details.
UART and OTA DFU	UART and OTA DFU binary files have been updated to be in EBL format. Simplicity Commander, included into SDK, can be used to flash devices. Please see UG136 document for details.
BGAPI library	BGAPI library is now separated from the stack library. It must be linked with the application if BGAPI commands are tend to be used. Please see UG136 document for details.
endpoint_closing event	This event is removed from the API documentation as it has been decided not to be implemented.

## Quality Improvements

Examples and demos updated and simplified

Documentation updated

BGTool and bgbuild tools updated

Robustness, timing and other quality fixes in link layer

Stack robustness improvements, especially in GAP, GATT and Security Manager

GATT database improvements

Fixed a memory leak in GATT server

Reduced power consumption for all use cases

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
347	BGScript freeze	BGScript freezes, when trying to store a PS key, which is longer than 180 bytes.
495	endpoint_read_counters()	The command does not return correct data.
638	sm_store_bonding_configuration()	The command returns an error, indicating that it is not implemented.

## Known Issues in this Release

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection update can fail if connection event is missed.
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes. Update: The limitation is now properly documented, but the root cause has not been fixed yet in this release.



# ***Bluetooth Smart Software 1.0.4 build 1073***

<b>Software Version</b>	1.0.4 build 1073
<b>Software Status</b>	GA 3
<b>Release Date</b>	17th of June, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 1.0.4 (build 1073) compared to 1.0.2 (build 755)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
hardware_set_lazy_soft_timer()	BGAPI command to allow a sliding timer to be used to let the stack optimize wake-up times and save power.
hardware_enable_dcdc()	BGAPI command to enable and disable DC/DC.

### **Notes**

<b>Note</b>	<b>Explanation</b>
Qualification	All official <i>Bluetooth</i> qualifications are completed.
IAR version	In <i>Bluetooth</i> C development, one should have IAR version 7.40 or newer in use.
hardware_set_soft_timer()	Time parameter unit of this command has been now properly documented, and the maximum time value is approximately 18.2 hours (2147483647 clock ticks).
Windows 10 / Edge	Using Edge browser in Windows 10 to download <i>Bluetooth</i> Smart SDK for Simplicity Studio or Blue Gecko <i>Bluetooth</i> Smart BGScript and IAR SDK will result an error note “The signature of <EXE file name> is corrupt or invalid.” The file is still fully downloaded and the SDK can be installed.

## Quality Improvements

Examples and demos updated

Documentation updated

BGTool and bgbuild tools updated and Linux and Mac OS compatibility improved

UART DFU and OTA DFU work correctly even if PTI is enabled

Stack and link layer robustness improvements

EM2 sleep wake-up time reduced to save power

Advertising power consumption reduced

RAM consumption optimizations and enabling more dynamic memory allocation for applications

Android and iOS interoperability improved

Connection update request instant value fixed

Advertising functionality optimizations

## Fixed Known Issues since the previous Release

ID	Issue	Explanation

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Description updated: Connection update can fail if connection event is missed.
347	BGScript freeze	BGScript freezes, when trying to store a PS key, which is longer than 180 bytes.
495	endpoint_read_counters()	The command does not return correct data.
638	sm_store_bonding_configuration()	The command returns an error, indicating that it is not implemented.

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
681	gatt_server_send_user_write_response()	If a user application tries to send a user write response greater than 128 bytes, the stack crashes.

# ***Bluetooth Smart Software 1.0.2 build 755***

<b>Software Version</b>	1.0.2 build 755
<b>Software Status</b>	GA 2
<b>Release Date</b>	29th of March, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module BGM113 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 1.0.2 (build 755) compared to 1.0.0 (build 615)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
BGM113	Support and examples for BGM113 <i>Bluetooth</i> Smart Module added.
Qualification	All controller and host side qualification test are run and passed. Official <i>Bluetooth</i> listings are still pending.
RX/TX activity PIN	Possibility to observe RX/TX activity by using <obsel> tag in hardware.xml file.
ATT MTU size increase	Attribute Protocol MTU size can be increased up to 58 bytes.
system_get_random_data()	BGAPI command to get random data up to 16 bytes.
sm_set_oob_data()	BGAPI command to set out of band encryption data for the device.
sm_confirm_passkey event	New event to indicate a request to display the passkey to the user and the user to confirm it.
hardware_set_uart_configuration()	BGAPI command to configure UART interface.
hardware_get_time()	BGAPI command to get elapsed time since last reset of RTCC.
hardware_read_adc_channel()	BGAPI command to read a specific ADC channel.

Feature	Explanation
<code>gatt_set_max_mtu()</code>	BGAPI command to set maximum number of GATT message transfer units.
<code>gatt_mtu_exchanged</code> event	New event to indicate that GATT exchange procedure has been completed.
<code>sm_configure()</code>	<code>sm_configure</code> command parameter <code>mitm_required</code> is renamed to <code>flags</code> for accepting more security configurations, namely <code>bonding_required</code>

## Quality Improvements

Examples and demos updated  
 Documentation updated  
 BGTool and other tools updated and OS X support improved  
 Master and slave can now increase security at the same time without other one becoming unresponsive  
 UART communication works reliably also for 2.4M and above baud rates  
 Scanning and advertising fixed to work at the same time  
 Improved event listening according to the transmit window setting  
 Improved Android OS interoperability  
 Memory usage optimizations for BGScript and TX queue  
 Memory leak fix for UART configuration  
 Fix for GATT client to handle long attribute data fully  
 Fix `le_gap_set_mode()` command to also restart advertising properly  
 Fix disable advertising to immediately also stop advertising  
 Robustness fixes for validating and updating advertisement data  
 Optimizations for startup time when waking up before advertising to save current  
 Access address error fixed  
 Current consumption optimizations for DTM, NCP mode and advertising  
 Memory leak fixed in scan response handling  
 Multi-connection error situation handling improved  
 DFU improvements

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
172	Notifications	If the devices are bonded, and then disconnected, reconnected and the connection is encrypted, no <code>gatt_server_characteristic_status</code> event is sent to let user know if the notifications have been enabled or not.

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
195	ATT MTU size	ATT MTU size is limited to its default value (23).
197	hardware_set_soft_timer()	Using hardware_set_soft_timer() with very small timeout parameter, like 1, will cause a crash.
199	Channel map request	If channel map request handling takes too long time, the connection is terminated.
223	TX power in ADV data	Even if TX power has been set with system_set_tx_power() command, it is always 0 dBm in advertisement data.
226	gatt_characteristic_value event	Even if gatt_prepare_characteristic_value_write() command succeeds, sometimes gatt_characteristic_value event is not returned.
254	Scanning events	Scanning for new devices in master mode does not work or it takes a long time if a lot of connections are active and connection interval has been defined to be very small.
277	hardware_set_soft_timer()	API Reference Manual says that timer value parameter unit should be given in milliseconds, but actually the value should be given in clock ticks, which are 1/32768 of a millisecond.
312	BGScript reconnect	If the device is changing its advertising as non-connectable while being connected, after disconnection it cannot reconnect, when BGScript application is used. This works OK when using BGAPI.
323	TX power steps	There are no intermediate TX power steps between -12.5 dBm and -26 dBm TX power settings.

## Known Issues in this Release

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
247	Connection update	Connection event can be missed if it happens at the same time as a connection update.
347	BGScript freeze	BGScript freezes, when trying to store a PS key, which is longer than 180 bytes.

# ***Bluetooth Smart Software 1.0.0 build 615***

<b>Software Version</b>	1.0.0 build 615
<b>Software Status</b>	GA 1
<b>Release Date</b>	20th of February, 2016
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module EFR32 Blue Gecko EFR32 Mighty Gecko

## **Changes: 1.0.0 (build 615) compared to 0.9.2 (build 446)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
<code>gatt_server_find_attribute()</code>	New command to find attributes of certain type from a local GATT database.
<code>le_connection_disable_slave_latency()</code>	Device in slave mode can temporarily disable/enable slave latency.
Host wake-up PIN support	Support for PIN configuration, which can be used to wake up external host processor.
OTA firmware update (internal flash)	Over The Air firmware update has been enabled in the stack. However, there is no automatic code generating for this feature yet in Simplicity Studio.
<i>Bluetooth</i> Low Energy C SDK	Necessary changes and implementation for integrating <i>Bluetooth</i> Smart Software with <i>Bluetooth</i> Low Energy C SDK in Simplicity Studio, supporting the usage of many other tools there as well.

### **Quality Improvements**

Examples and demos updated

Documentation updated

Multi-connection robustness improvements

Lowest TX power setting is now -26 dBm instead of -12.5 dBm

Memory usage optimizations



Memory leak fixes  
 Multiple SW crashes fixed  
 PTI configuration structure fixed to enable packet trace debugging with Simplicity Studio  
 Improved interoperability with the latest iOS and Android devices  
 Updates and bug fixes for BGTool PC SW, now integrated also with Simplicity Studio  
 Slave latency feature fixed  
 Sequencer and scheduler optimizations and fixes to improve connection robustness  
 Bonding robustness fixes related to master and slave modes  
 Improvements in UART handling  
 Sleep optimizations for applications  
 Updates and improvements to DFU handling  
 Updates to Security Manager robustness and optimizations  
 Channel map handling improvements  
 GATT parser robustness improvements  
 Robustness improvements for scanning and advertising functionality  
 BGAPI improvements for sleep mode

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
113	128-bit service UUID	Automatic 128-bit service UUID advertising does not work using <code>le_gap_set_mode()</code> command. Workaround is to use custom advertisement packet content and build it manually.
146	Encrypted data transfer	Sending a lot of data over encrypted link to both directions will eventually fail.
164	Bonding timeout	When both devices have been set in bondable mode and master increases security and also latency value is set, bonding fails with 0x185 (timeout).
177	Multiple connections	Master cannot form multiple connections if the lowest possible connection interval is used. Workaround is to use other values.
180	Connection counter	LLCP Connection Update Request can cause connection counter to go out of sync, resulting the connection to be dropped.
185	Reconnection failure	When a connection request packet is not fully sent, the connection request will be ignored and it will fail with 0x181 (wrong state) when reconnecting is attempted.
187	LL_VERSION_IND	When queried over the air, LL_VERSION_IND indicates <i>Bluetooth</i> version to be 4.0 instead of 4.1.

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
192	Connection update	When maximum connection interval is used and the stack is run in slave mode, it does not respond to connection update requests.
196	LL_PING bit	LL_PING bit is not ignored properly between two controllers.
207	Bonding initialization	If the lowest connection interval is used and bonding is initialized, connection is closed.
208	GATT timeout	Random GATT timeouts are seen with multiple simultaneous connections.
212	Slave latency 1	When the stack is in slave mode and slave latency is used, connection update will cause supervision timeout, and the connection is closed.
228	Slave latency 2	Setting slave latency value to 0 after it has been set to a higher value, will cause connection failure.

## Known Issues in this Release

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
172	Notifications	If the devices are bonded, and then disconnected, reconnected and the connection is encrypted, no gatt_server_characteristic_status event is sent to let user know if the notifications have been enabled or not.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
195	ATT MTU size	ATT MTU size is limited to its default value (23).
197	hardware_set_soft_timer()	Using hardware_set_soft_timer() with very small timeout parameter, like 1, will cause a crash.
199	Channel map request	If channel map request handling takes too long time, the connection is terminated.

ID	Issue	Explanation
223	TX power in ADV data	Even if TX power has been set with <code>system_set_tx_power()</code> command, it is always 0 dBm in advertisement data.
226	<code>gatt_characteristic_value</code> event	Even if <code>gatt_prepare_characteristic_value_write()</code> command succeeds, sometimes <code>gatt_characteristic_value</code> event is not returned.
247	Connection update	Connection event can be missed if it happens at the same time as a connection update.
254	Scanning events	Scanning for new devices in master mode does not work or it takes a long time if a lot of connections are active and connection interval has been defined to be very small.
277	<code>hardware_set_soft_timer()</code>	API Reference Manual says that timer value parameter unit should be given in milliseconds, but actually the value should be given in clock ticks, which are 1/32768 of a millisecond.
312	BGScript reconnect	If the device is changing its advertising as non-connectable while being connected, after disconnection it cannot reconnect, when BGScript application is used. This works OK when using BGAPI.
323	TX power steps	There are no intermediate TX power steps between -12.5 dBm and -26 dBm TX power settings.
N/A	Qualification	The following qualification test cases do not pass yet: TC/JW/BV-02-C TC/CN/BV-01-C TC/CN/BV-02-C TP/CON/MAS/BV-30-C TP/CON/MAS/BV-29-C TP/CON/MAS/BI-05-C TP/CON/SLA/BV-22-C TP/SEC/MAS/BV-14-C TP/CON/SLA/BV-23-C TP/CON/SLA/BI-06-C TP/SEC/MAS/BV-12-C TP/SEC/MAS/BV-13-C TP/DDI/ADV/BV-19-C

# ***Bluetooth Smart Software 0.9.2 build 446***

<b>Software Version</b>	0.9.2 build 446
<b>Software Status</b>	Beta 2
<b>Release Date</b>	18th of December, 2015
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module

## **Changes: 0.9.2 (build 446) compared to 0.9.1 (build 136)**

### **New Features**

<b>Feature</b>	<b>Explanation</b>
Energy Mode 2	Energy Mode 2 (EM2) support added for lower current consumption when sleeping
le_connection_get_rssi()	le_connection_get_rssi() command added to BGAPI
ADC commands	hardware_config_adc_reference() and hardware_read_adc() commands added to BGAPI
system_set_tx_power()	system_set_tx_power() command added to BGAPI
LFXO configuration	LFXO usage is made configurable in hardware.xml
Wake-up PIN	Wake-up PIN is made configurable in hardware.xml and gecko_system_awake event is introduced
DTM	Direct Test Mode tests implemented
PTI	Packet trace / Network Analyzer enablers added for Simplicity Studio

### **Quality Improvements**

SDK examples updated

Documentation updated

No need to reset the device anymore between DTM tests

Default maximum amount of simultaneous connections is set to four and the value is made configurable up to eight

Support for adding external BGAPI commands added

Multiple repeating soft timers enabled for BGScript  
Correct power amplifier is dynamically chosen based on TX power setting  
ADC conversion waiting bit fixed  
Default output power is set to 8 dBm  
EM2 wake-up timings optimized  
MIC failures fixed to improve secure connection robustness  
HCI advertisement event fixed  
Many out of memory fixes  
Many memory leaks fixed  
Many memory allocation optimizations  
Encrypted streaming data lost fixed  
Possible flash write error handled properly  
Fixed RTCC usage  
UART timeout interrupt removed when the device is inactive  
HCI reset commands fixed  
New ACL queues for link layer implemented  
Crystal tuning value handling fixed  
Flow control fixed for sending multiple notifications  
Variable access fixed in BGScript  
I2C timeouts fixed  
Control packet bits fixed in HCI commands and ACL packets  
HCI events do not miss data anymore  
Correct dBm values used in TX power configuration  
Missing IRQ flags added  
Bonding fixed in slave mode and robustness increased  
Create connection cancel command fixed  
Scan response and advertisement handling fixed  
Incoming data packet handling memory optimizations  
Stack flash size optimizations  
Connection close events do not randomly fail anymore  
Connection events can be skipped without crashing  
No link timeout errors anymore with iOS devices  
TX and RX activity current consumption peaks fixed  
Multiple connections in master mode fixed  
Many crashes fixed  
Connection parameter update does not cause connection failure anymore  
Packet queueing for TX fixed for encrypted connections  
Access address issues fixed for master mode  
Instant checking with connection update and channel map request fixed  
Endianness for connection encryption command fixed  
LL\_FEATURE\_RSP packet fixed  
Scan duty cycle fixed  
Scan response events fixed  
Window size fixed  
Disconnecting from iOS devices works correctly  
Device name is correctly advertised with iOS devices

Disconnecting a non-established connection does not break the next connection anymore

General PTS failure fixes

le\_gap\_set\_adv\_data() fixed to show the correct scan response data

Consecutive bonding does not fail anymore after a failed pairing and bonding

Advertising while connected and advertising restart fixed

GPIO interrupts fixed

Connection parameter update parameter value is checked correctly

RSSI values fixed in scan responses

BGScript utility functions added

UART data transfer hang with multiple queued L2CAP packets fixed

## Fixed Known Issues since the previous Release

ID	Issue	Explanation
13	Scanning and advertising	Simultaneous scanning and advertising does not always work.
16	Bonding	Unauthenticated bonding might sometimes fail in slave mode.
92	Advertising restart	Restarting advertising too quickly does not always work.
101	Connection parameter update	In slave mode, sometimes connection parameter update causes supervision timeout.

## Known Issues in this Release

ID	Issue	Explanation
112	le_gap_scan_response	Event le_gap_scan_response does not contain advertising channel information.
113	128-bit service UUID	Automatic 128-bit service UUID advertising does not work using le_gap_set_mode() command. Workaround is to use custom advertisement packet content and build it manually.
146	Encrypted data transfer	Sending a lot of data over encrypted link to both directions will eventually fail.
164	Bonding timeout	When both devices have been set in bondable mode and master increases security and also latency value is set, bonding fails with 0x185 (timeout).

ID	Issue	Explanation
172	Notifications	If the devices are bonded, and then disconnected, reconnected and the connection is encrypted, no <code>gatt_server_characteristic_status</code> event is sent to let user know if the notifications have been enabled or not.
177	Multiple connections	Master cannot form multiple connections if the lowest possible connection interval is used. Workaround is to use other values.
180	Connection counter	LLCP Connection Update Request can cause connection counter to go out of sync, resulting the connection to be dropped.
185	Reconnection failure	When a connection request packet is not fully sent, the connection request will be ignored and it will fail with 0x181 (wrong state) when reconnecting is attempted.
187	LL_VERSION_IND	When queried over the air, LL_VERSION_IND indicates <i>Bluetooth</i> version to be 4.0 instead of 4.1.
192	Connection update	When maximum connection interval is used and the stack is run in slave mode, it does not respond to connection update requests.
194	Connection update complete event	If a connection parameter update request is rejected by a remote device, the reject reason is not correctly returned by connection update complete event.
195	ATT MTU size	ATT MTU size is limited to its default value (23).
196	LL_PING bit	LL_PING bit is not ignored properly between two controllers.
197	<code>hardware_set_soft_timer()</code>	Using <code>hardware_set_soft_timer()</code> with very small timeout parameter, like 1, will cause a crash.
199	Channel map request	If channel map request handling takes too long time, the connection is terminated.
207	Bonding initialization	If the lowest connection interval is used and bonding is initialized, connection is closed.
208	GATT timeout	Random GATT timeouts are seen with multiple simultaneous connections.

ID	Issue	Explanation
212	Slave latency 1	When the stack is in slave mode and slave latency is used, connection update will cause supervision timeout, and the connection is closed.
223	TX power in ADV data	Even if TX power has been set with system_set_tx_power() command, it is always 0 dBm in advertisement data.
228	Slave latency 2	Setting slave latency value to 0 after it has been set to a higher value, will cause connection failure.
N/A	Qualification	<p>The following qualification test cases do not pass yet:</p> <ul style="list-style-type: none"> <li>PTS: TC/JW/BV-02-C</li> <li>TP/CON/MAS/BV-30-C</li> <li>TP/CON/MAS/BV-29-C</li> <li>TP/CON/MAS/BI-05-C</li> <li>TP/CON/SLA/BV-22-C</li> <li>TP/SEC/MAS/BV-14-C</li> <li>TP/CON/SLA/BV-23-C</li> <li>TP/CON/SLA/BI-06-C</li> <li>TP/SEC/MAS/BV-12-C</li> <li>TP/SEC/MAS/BV-13-C</li> <li>TP/DDI/ADV/BV-19-C</li> </ul>



# ***Bluetooth Smart Software 0.9.1 build 136***

<b>Software Version</b>	0.9.1 build 136
<b>Software Status</b>	Beta
<b>Release Date</b>	17th of August, 2015
<b>Affected Products</b>	BGM111 <i>Bluetooth</i> Smart Module

## **Features in the First Release**

<b>Feature</b>	<b>Explanation</b>
BLE 4.1	<i>Bluetooth</i> Smart 4.1 compliant stack
ATT	Attribute Profile
GATT	Generic Attribute Profile
GAP	Generic Access Profile
SMP	Security Manager Protocol
BGAPI™	Serial protocol API over UART for modem usage
BGLIB™	Host API/library which implements BGAPI serial protocol
BGScript™	Scripting language for standalone usage

## **Fixed Known Issues since the previous Release**

<b>ID</b>	<b>Feature</b>	<b>Explanation</b>
N/A	N/A	First public release

## **Known Issues in this Release**

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
13	Scanning and advertising	Simultaneous scanning and advertising does not always work.

<b>ID</b>	<b>Issue</b>	<b>Explanation</b>
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