s112_nrf52 release notes

Introduction to the s112_nrf52 release notes

About the document

These release notes describe the changes in the s112_nrf52 from version to version.

The release notes are intended to list all relevant changes in a given version. They are kept brief to make it easy to get an overview of the changes. More details regarding changes and new features can be found in the s112_nrf52 migration document (normally available for major releases only).

Issue numbers in parentheses are for internal use and should be disregarded by the customer.

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s112 nrf52 6.1.1

This is a production release that contains minor but important changes to the 6.1.0 release.

Notes:

- The release notes list changes since the s112_nrf52_6.1.0 release.
- This SoftDevice is binary compatible to the s112_nrf52_6.1.0 and memory requirements have not changed. Applications are therefore not required to be recompiled.

SoftDevice Properties

- This SoftDevice is production tested for nRF52810 and nRF52832.
- This SoftDevice contains the Master Boot Record (MBR) version 2.4.1 (DRGN-10680).
 - This MBR version is compatible with previous MBR versions.
- The combined MBR and SoftDevice memory requirements for this version are the same as for the s112_nrf52_6.1.0:
 - Flash: 100.0 kB (0x19000 bytes).
 - RAM: 3.86 kB (0xF70 bytes). This is the minimum required memory. The actual requirements depend on the configuration chosen at sd_ble_enable() time.
 - The Firmware ID of this SoftDevice is 0x00B8.

Changes

- SoftDevice
 - The MBR 2.4.1 is a minor backward compatible configuration update of the MBR for this release. There were no bugs resolved in this update, only minor build configuration option changes (DR GN-10680).
 - Applications can improve the radio utilization for multiprotocol applications by enabling the improved advertiser role scheduling configuration through the BLE Option API. The time reserved for an advertising event will then be decreased by up to 1.3 ms (DRGN-10398).

Bug Fixes

- SoftDevice
 - Fixed an issue where NRF_TIMER0 may not be reset at the start of a radio timeslot (DRGN-10650).

Limitations

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- SoftDevice
 - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
 - Synthesized low frequency clock source is not tested or intended for use with the BLE stack.
 - Applications must not modify the SEVONPEND flag in the SCR register when running in priority levels higher than 6 (priority level numerical values lower than 6) as this can lead to undefined behavior.
- GATT
 - To conform to the Bluetooth Core Specification v 5.0, there shall be no secondary service that is not referenced somehow by a primary service. The SoftDevice does not enforce this (DRGN-906).

Known Issues

- SoftDevice
 - sd_ble_gap_device_name_set() may return NRF_ERROR_INTERNAL instead of NRF_ERROR_NO_MEM if the allocated space for the device name is too small. A workaround is to allocate enough space for the device name before calling sd_ble_gap_device_name_set() (DRGN-10195).
 - If the application requests an earliest possible Radio Timeslot and the timeslot is blocked, the SoftDevice will repeat the same request until it times out, thereby blocking the main context and the lower application interrupt priority levels. A workaround is to increase the timeout of the Radio Timeslot request to make it able to fit after the event that is blocking the request (DRGN-10402).
 - The application should not enable MWU if the SoftDevice is run on nRF52832 as this leads to undefined behavior (DRGN-10917).
 - The SoftDevice will generate a resolvable address for the TargetA field in directed advertisements if the target device address is in the device identity list with a non-zero IRK, even if privacy is not enabled and the local device address is set to a public address. This can make devices certified for Bluetooth versions older than 4.2 ignore the advertising packets. This issue is present in SoftDevice versions 3.0.0 and later. A workaround is to set the IRK to zero or to remove the device address from the device identity list (DRGN-10659).

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s112_nrf52_6.1.0

The s112_nrf52_6.1.0 is the first S112 SoftDevice to support both nRF52810 and nRF52832.

Notes:

- The release notes list changes since the s112_nrf52_6.0.0 release.
- This SoftDevice is binary compatible to the s112_nrf52_6.0.0. Applications are therefore not required to be recompiled and memory requirements have not changed.

SoftDevice Properties

- This SoftDevice is production tested for nRF52810 and nRF52832.
- This SoftDevice contains the Master Boot Record (MBR) version 2.2.2 (DRGN-9537).
- The combined MBR and SoftDevice memory requirements for this version are the same as for the s112_nrf52_6.0.0:
 - Flash: 100.0 kB (0x19000 bytes).
 - RAM: 3.86 kB (0xF70 bytes). This is the minimum required memory. The actual requirements depend on the configuration chosen at sd_ble_enable() time.
- The Firmware ID of this SoftDevice is 0x00B0.

New Functionality

- SoftDevice
 - The SoftDevice variant, flash usage, reserved PPIs, and reserved interrupt priorities are now available at compile time to the application through new APIs (DRGN-9627).
 - An API is added to enable the application to remove an unused UUID entry from the UUID table (DRGN-10389).
- GAP
- With the new sd ble gap adv addr get() API, the application can now get the Bluetooth device address that is being used by the advertiser (DRGN-10470).

Changes

- SoftDevice
 - On nRF52810, the time reserved by the SoftDevice is reduced by 297 µs when performing a flash word write, and by 4.7 ms when performing a flash page erase. This increases the probability of successfully scheduled flash operations (DRGN-9048).
 - Improved documentation for the NRF_ERROR_INVALID_STATE error code (DRGN-9693).
 - When the SoftDevice is acting as a peripheral, and the RC oscillator is used as the LFCLK source, the configured RC calibration period can now be increased. By default, the SoftDevice will now increase the receive window if two consecutive packets are missed and will then perform RC calibration if necessary (DRGN-9852).
 - SoftDevice 112_nrf52_6.0.0 accepted an advertising interval larger than BLE_GAP_ADV_INTERVAL_MAX as an experimental feature. However, this configuration could make the SoftDevice assert. Now, the SoftDevice will return NRF_ERROR_INVALID_PARAM if the application configures an advertising interval larger than BLE_GAP_ADV_INTERVAL_MAX (DRGN-10322).
 - Radio utilization for multi-protocol applications are improved significantly as the time allocated for a normal Radio Timeslot request session has decreased by up to 1 ms (DRGN-10405).

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- GATT
 - sd_ble_gatts_rw_authorize_reply() now allows sending the 0xFC (Write Request Rejected) profile error code which was introduced in the Bluetooth Core Specification Supplement CSSv7 (DRGN-10373).
- LL
- Instead of disconnecting, the SoftDevice will now respond with LL_UNKNOWN_RSP when receiving control procedure PDUs with invalid lengths (DRGN-9997).

Bug Fixes

- SoftDevice
 - Fixed an issue where a HardFault could generate a new HardFault if the application called a NULL pointer (DRGN-9607).
 - Fixed an issue where the SoftDevice HardFault handler could hang if the application wrote to protected memory (DRGN-9694).
 - Fixed an issue where the HFXO would sometimes not be released properly after RC calibration. This is in addition to the bug fix for a similar condition resolved in s112_nrf52_6.0.0 (DRGN-9920, DRGN-10166).
 - Fixed an issue where the PA/LNA GPIOs could be triggered too late. Furthermore, the PA pin is now set active 23 μs before RADIO TX start, instead of 5 μs before RADIO TX start. The LNA pin is set active 5 μs before RADIO RX start, as before (DRGN-9928).
 - Fixed documentation for SD_EVT_IROHANDLEr and RADIO_NOTIFICATION_IROHANDLEr, where the default interrupt priority was documented incorrectly (DRGN-10174).
 - Fixed an issue where LFRC oscillator calibration could fail (DRGN-10255).
 - Fixed an issue that could make the SoftDevice assert when scheduling events close together (DRGN-10316).
- GAP
- Fixed an issue where the advertiser would not update its address type if sd_ble_gap_addr_set() or sd_ble_gap_privacy_set() was called after sd_ble_gap_adv_set_configure() and before sd_ble_gap_adv_start() (DRGN-10025).
- Fixed an issue that could cause an assert when an advertiser configured with invalid parameters connected to a peer (DRGN-10355).
- Fixed an issue that could cause an assert when the advertiser was stopped (DRGN-10364).
- LL
- Fixed an issue that could cause links to disconnect (DRGN-9844).
- Fixed an issue where the slave might not listen during the entire connection parameter update (DRGN-10086).

Limitations

- SoftDevice
 - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
 - Synthesized low frequency clock source is not tested or intended for use with the BLE stack.
 - Applications must not modify the SEVONPEND flag in the SCR register when running in priority levels higher than 6 (priority level numerical values lower than 6) as this can lead to undefined behavior.
- GATT
 - To conform to the Bluetooth Core Specification v 5.0, there shall be no secondary service that is not referenced somehow by a primary service. The SoftDevice does not enforce this (DRGN-906).

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Known Issues

- SoftDevice
 - sd_ble_gap_device_name_set() may return NRF_ERROR_INTERNAL instead of NRF_ERROR_NO_MEM if the allocated space for the device name is too small. A workaround is to allocate large enough space for the device name before calling sd_ble_gap_device_name_set() (DRGN-10195).
 - If the application requests an earliest possible Radio Timeslot and the timeslot is blocked, the SoftDevice will repeat the same request until it times out, thereby blocking the main context and the lower application interrupt priority levels. A possible workaround is to increase the timeout of the Radio Timeslot request to make it able to fit after the event that is blocking the request (DRGN-10402).

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s112_nrf52_6.0.0

The main new feature of s112_nrf52_6.0.0 compared to s112_nrf52810_5.1.0 is channel information in the Received Signal Strength Indication (RSSI) reports.

Notes:

- This release has changed the Application Programmer Interface (API). This requires applications to be recompiled.
- The memory requirements of the S112 SoftDevice have changed.
- The release notes list changes since s112_nrf52810_5.1.0.
- The SoftDevice release naming convention has changed: Instead of specifying the platform supported by the SoftDevice in the release name, the release notes will have this information.

SoftDevice properties

- This SoftDevice variant is production tested for nRF52810. It can be used on nRF52832 for development purposes.
- This version of the SoftDevice contains the Master Boot Record (MBR) version 2.2.2 (DRGN-9537).
- The combined MBR and SoftDevice memory requirements for this version are as follows:
 - Flash: 100.0 kB (0x19000 bytes).
 - RAM: 3.86 kB (0xF70 bytes). This is the minimum required memory. The actual requirements depend on the configuration chosen at sd_ble_enable() time.
- The Firmware ID of this SoftDevice is 0x00A7.

New functionality

- SoftDevice
 - The SoftDevice API for advertising and scanning is updated and prepared to support future features. For more information, see the migration document (DRGN-9712).
- GAP
- Channel number for RSSI measurement is now available in advertising reports (DRGN-9473).
- Channel number for RSSI measurement is now available for connections (DRGN-9667).
- The SoftDevice now supports the configuration of TX power per link and per role (DRGN-6659).

Changes

- SoftDevice
 - The SoftDevice now returns NRF_ERROR_BUSY from flash API functions until the event generated after a previous flash operation has been pulled (DRGN-9565).
 - The SoftDevice now has an additional API for write-protecting memory. This can now be achieved by accessing the BPROT peripheral configuration registers through sd_protected_register_write() (DRGN-9337).
 - A message sequence chart for Unexpected Security Packet Reception has been added to Peripheral Security Procedures in the API documentation (DRGN-9479).

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- GATT
 - The SoftDevice will now return NRF_ERROR_TIMEOUT instead of NRF_ERROR_BUSY from GATT API functions if a GATT procedure is blocked due to a previous procedure timeout (DRGN-9545).
 - Clarified API documentation: The length field in the parameter struct passed to sd_ble_gatts_hvx() may be written to by the SoftDevice (DRGN-9620).
- LL
- The documentation of the PHY Update procedure is improved (DRGN-9678).
- Bluetooth Core Specification Erratum #7408 is incorporated, meaning that it is now accepted to receive an LL UNKNOWN RSP during encryption procedure (DRGN-8414).

Bug fixes

- SoftDevice
 - Fixed an issue where sd_ble_gap_rssi_get() could sometimes return NRF_ERROR_SUCCESS with an invalid RSSI (DRGN-9746).
 - Fixed an issue where the HFXO would sometimes not be released properly after RC calibration (DRGN-9920).
- GATT
 - Fixed an issue where the SoftDevice could drop a write request if it was received at the same time as a write command (DRGN-9709).
- LL
- Fixed an issue where the slave could disconnect with status code BLE_HCI_DIFFERENT_TRANSACTION_COLLISION if master sent an LL_UNKNOWN_RSP after a PHY procedure collision (DRGN-9870).
- Fixed an issue where the SoftDevice might advertise with the RxAdd bit set to 1 for undirected advertisements. According to the Bluetooth Core Specification v 5.0, the RxAdd bit is reserved for future use for these PDU types (DRGN-9739).
- · Fixed an issue where the SoftDevice could assert if the identity list was used while advertising (DRGN-9723).

Limitations

- SoftDevice
 - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
 - Synthesized low frequency clock source is not tested or intended for use with the BLE stack.
 - Applications must not modify the SEVONPEND flag in the SCR register when running in priority levels higher than 6 (priority level numerical values lower than 6) as this can lead to undefined behavior.
- GATTS
 - To conform to the Bluetooth Core Specification v 5.0, there shall be no secondary service that is not referenced somehow by a primary service. The SoftDevice does not enforce this (DRGN-906).

Known Issues

- SoftDevice
 - If the application calls a NULL pointer, there will be a HardFault inside the SoftDevice HardFault handler (DRGN-9607).
 - If sd_ble_gap_addr_set() or sd_ble_gap_privacy_set() is called after sd_ble_gap_adv_set_configure() and before sd_ble_gap_adv_start(), the advertiser will not update its address type (DRGN-10025).

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s112 nrf52810 5.1.0

This release is the first production version of the S112. The S112 is a size-optimized peripheral-only BLE SoftDevice for Nordic Semiconductor's nRF52810 chip. The S112 API is a compatible subset of the S132 SoftDevice API. For features that are common to S112 and S132, the API is the same. To show the API compatibility, the S112 follows the same version numbering as S132.

The main change relative to the s112_nrf52810_5.1.0-2.alpha is that the observer role functionality is removed from the SoftDevice. The SoftDevice also has some minor updates and bug fixes.

Notes:

The priority of SoftDevice interrupts SD_EVT_IRQn (SWI2_IRQn) and RADIO_NOTIFICATION_IRQn (SWI3_IRQn) is 6. This is different from S132 4.x and previous SoftDevices (DRGN-9245).

SoftDevice properties

- The S112 SoftDevice Specification document will be available at http://infocenter.nordicsemi.com/.
- This version of the SoftDevice contains the Master Boot Record (MBR) version 2.2.2 (DRGN-9537).
- The combined MBR and SoftDevice memory requirements for this version are as follows:
 - Flash: 96 kB (0x18000 bytes).
 - RAM: 3.68 kB (0xeb8 bytes). This is the minimum required memory. The actual requirements depend on the configuration chosen at sd ble enable() time.

Device Compatibility

The SoftDevice is built, production tested, and qualified for use with nRF52810.

The SoftDevice is not production tested and qualified for use with nRF52832. However, the SoftDevice can be used for development purposes on the nRF52832 if minor performance and stability issues are accepted during development.

New functionality

This release has no new features compared to the s112 nrf52810 5.1.0-2.alpha.

Changes

Relative to the s112 nrf52810 5.1.0-2.alpha:

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- GAP
- Observer role is no longer supported, and the following functions, structures, defines, and events have been removed (DRGN-9298):
 - BLE GAP EVT ADV REPORT
 - BLE_GAP_TIMEOUT_SRC_SCAN
 - BLE GAP SCAN INTERVAL MIN, BLE GAP SCAN INTERVAL MAX
 - BLE_GAP_SCAN_WINDOW_MIN, BLE_GAP_SCAN_WINDOW_MAX
 - BLE_GAP_SCAN_TIMEOUT_MIN, BLE_GAP_SCAN_TIMEOUT_MAX
 - ble_gap_scan_params_t
 - ble gap evt adv report t
 - sd_ble_gap_scan_start()
 - sd_ble_gap_scan_stop()
- 11
- The SoftDevice now sends LL REJECT EXT IND instead of LL REJECT IND if the peer has indicated support for LL REJECT EXT IND (DRGN-9539).

Relative to the s132 nrf52 5.0.0:

- SoftDevice
 - sd_flash_protect() will now return NRF_ERROR_NOT_SUPPORTED if a non-zero value is given for a BPROT configuration register that is not available on the platform (DRGN-9336). (This was also part of the s112 nrf52810 5.1.0-2.alpha release.)
 - References to EGU* have been removed from nrf_soc.h and nrf_nvic.h as the SoftDevice is using SWI and not EGU to generate interrupts (DRGN-9257). (This was also part of the s112_nrf52810_5.1.0-2.alpha release.)

See the release notes for the s112_nrf52810_5.1.0-2.alpha for the rest of the changes.

Bug fixes

Compared to the s112_nrf52810_5.1.0-2.alpha, the following bugs have been fixed:

- SoftDevice
 - Fixed an issue where sd_ble_gatts_attr_get() and sd_ble_gatts_value_get() could return undocumented BLE_ERROR_INVALID_ATTR_HANDLE error code in a situation where they should have returned NRF_ERROR_NOT_FOUND (DRGN-9216).
 - Fixed an issue where the API documentation was referencing removed APIs (DRGN-9484).
 - Fixed an issue where some include directives were missing in ble gatts.h (DRGN-9467).
- GATT
 - Fixed an issue where the SoftDevice could assert if ATT packets longer than the LL packet size were sent and received at the same time (DRGN-9328).
- LL
- Fixed an issue where the SoftDevice could assert while doing radio or flash activity (DRGN-9463).
- Fixed an issue where the SoftDevice could send LL_FEATURE_RSP with incorrect FeatureSet (DRGN-9551).
- Fixed an issue where the slave disconnect event reason code was set to HCI_LOCAL_HOST_TERMINATED_CONNECTION instead of HCI_STATUS_CODE_PIN_OR_KEY_MISSING. This occurred if the LTK (Long Term Key) was missing during the re-encryption of the link (DRGN-9190). (This was also fixed in the s112 nrf52810 5.1.0-2.alpha release.)

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Limitations

- SoftDevice
 - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
 - Synthesized low frequency clock source is not tested or intended for use with the BLE stack.
 - Applications must not modify the SEVONPEND flag in the SCR register when running in priority levels higher than 6 (priority level numerical values lower than 6) as this can lead to undefined behavior.
- GATTS
 - To conform to the Bluetooth Core Specification v 5.0, there shall be no secondary service that is not referenced somehow by a primary service. The SoftDevice does not enforce this (DRGN-906).

Known Issues

- GAP
 - The SoftDevice can assert if the whitelist and identity list is set at the same time with matching addresses. A workaround for this issue is to clear the whitelist before setting the identity list (DRGN-9535).

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s112_nrf52810_5.1.0-2.alpha

The S112 is a size-optimized peripheral only BLE SoftDevice for Nordic Semiconductor's nRF52810 chip. The S112 API is a compatible subset of the S132 SoftDevice API. For features that are common to S112 and S132, the API is the same. To show the API compatibility, the S112 follows the same version numbering as S132. See the section "Changes" below for features that are not available in the S112 compared to the S132.

SoftDevice properties

- The combined MBR and SoftDevice memory requirements for this version are as follows:
 - Flash: 100 kB (0x19000 bytes)
 - RAM: 3.65 kB (0xe98 bytes)

Device Compatibility

This SoftDevice is built and tested for nRF52810.

For development purposes this SoftDevice can be run on the nRF52832, but some of the Errata workarounds for that device are not present in this version of the alpha SoftDevice. This may result in minor performance and stability issues on nRF52832.

New functionality

This release is the first version of the S112. It is based upon the s132_nrf52_5.0.0, and has no new functionality compared to that version.

Changes

Compared to the s132_nrf52_5.0.0, the following features have been removed:

- SoftDevice:
 - MWU is not supported, as the nrf52810 does not have MWU (DRGN-9341).
 - Cache is not supported, as the nrf52810 does not have Cache (DRGN-9256).
- GAP:
 - Observer role is still present in this alpha version of the SoftDevice, but might be removed for the production version.
 - Central Role is no longer supported and the following functions, structures, defines and events have been removed (DRGN-9145):
 - sd_ble_gap_connect() , sd_ble_gap_connect_cancel()
 - sd_ble_gap_encrypt()

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• BLE_GAP_EVT_CONN_PARAM_UPDATE_REQUEST
         • ble_gap_evt_conn_param_update_request_t
         • BLE GAP OPT COMPAT MODE 1
         • ble_gap_opt_compat_mode_1_t
         • BLE GAP ROLE CENTRAL , BLE GAP ROLE COUNT CENTRAL DEFAULT , BLE GAP ROLE COUNT CENTRAL SEC DEFAULT

LE Data Length Extension is no longer supported and the following structures, defines and events have been removed (DRGN-9242):

         • sd ble gap data length update()
         • BLE GAP EVT DATA LENGTH UPDATE REQUEST , BLE GAP EVT DATA LENGTH UPDATE
         • BLE GAP DATA LENGTH AUTO
         • ble_qap_data_length_params_t , ble_qap_data_length_limitation_t
         • ble_gap_evt_data_length_update_request_t , ble_gap_evt_data_length_update_t

L2CAP:

L2CAP Connection Oriented Channels is no longer supported and the header file ble_l2cap.h with it's functions, structures, defines and events has been removed (DRGN-923 8):

         • sd_ble_12cap_ch_setup(), sd_ble_12cap_ch_release(), sd_ble_12cap_ch_rx(), sd_ble_12cap_ch_tx(), sd_ble_12cap_ch_flow_control()
         • ble_l2cap_ch_rx_params_t, ble_l2cap_ch_setup_params_t, ble_l2cap_ch_tx_params_t, ble_l2cap_conn_cfq_t
         • BLE L2CAP EVT CH SETUP REQUEST, BLE L2CAP EVT CH SETUP REFUSED . BLE L2CAP EVT CH SETUP . BLE L2CAP EVT CH RELEASED .
           BLE L2CAP_EVT_CH_SDU_BUF_RELEASED , BLE L2CAP_EVT_CH_CREDIT , BLE L2CAP_EVT_CH_RX , BLE L2CAP_EVT_CH_TX
```

Bug fixes

Compared to the s132 nrf52 5.0.0, the following bugs have been fixed:

- SoftDevice
- Fixed an issue where Radio Notification could be suppressed between connection events when Connection Event Length Extension was enabled (DRGN-7687).

ble_12cap_evt_ch_setup_request_t , ble_12cap_evt_ch_setup_refused_t , ble_12cap_evt_ch_setup_t

GAP
Fixed an issue where the SoftDevice could assert if the white list and identity list were set at the same time with matching addresses (DRGN-9535).

Limitations

- SoftDevice
 - If Radio Notifications are enabled, flash write and flash erase operations initiated through the SoftDevice API will be notified to the application as Radio Events (FORT-809).
 - Synthesized low frequency clock source is not tested or intended for use with the BLE stack.
 - Applications must not modify the SEVONPEND flag in the SCR register when running in priority levels higher than 6 (priority level numerical values lower than 6) as this can lead to undefined behavior.
- GATTS
 - To conform to the Bluetooth Core Specification v 5.0, there shall be no secondary service that is not referenced somehow by a primary service. The SoftDevice does not enforce this (DRGN-906).

• ble_12cap_evt_t, ble_12cap_evt_ch_tx_t, ble_12cap_evt_ch_rx_t, ble_12cap_evt_ch_credit_t, ble_12cap_evt_ch_sdu_buf_released_t,

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Known Issues

No known issues.

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