

# **s140\_nrf52840 release notes**

## **Introduction to the s140\_nrf52840 release notes**

These release notes describe the changes in the s140\_nrf52840 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 the overview. More details regarding changes and new features may be found in the s140\_nrf52840 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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# s140\_nrf52840\_5.0.0-1.alpha

The s140 is a SoftDevice for the nRF52840 chip. This release, s140\_nrf52840\_5.0.0-1.alpha, is the first alpha release of the s140.

The s140 is based upon Nordic Semiconductor's s132 SoftDevice. These release notes list the changes and differences from **s132\_nrf52\_3.0.0**.

Notes:

- This is a major release which has changed the Application Programmer Interface (API) from the s132, requiring applications to be recompiled.

## SoftDevice properties

- The combined MBR and SoftDevice memory requirements for this version are as follows:
  - Flash: **132 kB** (0x21000 bytes).
  - RAM: **6.43 kB** (0x19C0 bytes) (minimum required memory - actual requirements are dependent upon the configuration chosen at sd\_ble\_enable() time).

## New functionality

- LL
  - Support for transmitting and receiving on the 2 Mbps PHY has been added (DRGN-7552).
  - Support for transmitting and receiving on LE Coded PHY (Long Range) using the 125 kbps bit rate (S=8 encoding scheme) has been added (DRGN-5702).

## Using LE Coded PHY and 2 Mbps

The SoftDevice provides a new GAP option BLE\_GAP\_OPT\_PREFERRED\_PHYS\_SET, a new SV call sd\_ble\_gap\_phy\_request(), and a new event, BLE\_GAP\_EVT\_PHY\_UPDATE to support the new PHYs. Please read the API documentation for more details about these.

This alpha version of the SoftDevice supports connection establishment using the 1 Mbps PHY and changing to use the other PHY options (2 Mbps and 125 kbps (Coded S=8)). It does not support connection with other PHY configurations. The link must be established first in 1 Mbps PHY and then the PHY can be changed using the above mentioned SV call.

The following table shows the supported PHY combinations of this alpha version of the SoftDevice when using LE Coded PHY and 2 Mbps. Encrypted links are not supported in all combinations as indicated in the Table. Where encryption is not supported, the link must be established with 1 Mbps PHY and not encrypted before changing PHY.

| PHY         |             | Max PDU payload size |           | Encryption support |
|-------------|-------------|----------------------|-----------|--------------------|
| TX          | RX          | TX                   | RX        |                    |
| 1 Mbps      | 1 Mbps      | up to 251            | up to 251 | Yes                |
| 1 Mbps      | 2 Mbps      | up to 251            | up to 251 | Yes                |
| 1 Mbps      | 2 Mbps      | 27                   | 27        | Yes                |
| 1 Mbps      | Coded (S=8) | 27                   | 27        | Yes                |
| 2 Mbps      | 1 Mbps      | up to 251            | up to 251 | No                 |
| 2 Mbps      | 1 Mbps      | 27                   | 27        | Yes                |
| 2 Mbps      | 2 Mbps      | up to 251            | up to 251 | No                 |
| 2 Mbps      | 2 Mbps      | 27                   | 27        | Yes                |
| 2 Mbps      | Coded (S=8) | 27                   | 27        | Yes                |
| Coded (S=8) | 1 Mbps      | 27                   | 27        | Yes                |

|             |             |    |    |     |
|-------------|-------------|----|----|-----|
| Coded (S=8) | 2 Mbps      | 27 | 27 | Yes |
| Coded (S=8) | Coded (S=8) | 27 | 27 | Yes |

**Note:** This alpha version of the SoftDevice does not support the 500 kbps bit rate (S=2 encoding scheme).

## Changes

- GAP
  - The SV-call `sd_ble_gap_tx_power_set()` is extended to support higher TX power (up to +9dBm) (DRGN-8310).

## Bug fixes

There are no bug fixes in this release.

## 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 level 1 as this can lead to undefined behavior.
  - If the application uses `TIMER0` inside a timeslot (scheduled with the Radio Timeslot API), `INTENSET` for `TIMER0` must be cleared before the timeslot ends (DRGN-7776).
  - The SV-calls `sd_mbr_command_vector_table_base_set()` and `sd_mbr_command_copy_bl()` are not supported (DRGN-8197). Using these calls leads to undefined behavior.
  - The SV calls `sd_flash_write()` and `sd_flash_page_erase()` do not check whether the flash pages being written or erased are write protected by ACL. Calling these functions on protected flash memory leads to undefined behavior (DRGN-8307).
- LL
  - The peripheral role has priority over the central role when it comes to keeping the links alive.
  - For LE Coded PHY and 2 Mbps, see the section "Using LE Coded PHY and 2 Mbps" above.
- GAP
  - A broadcaster **and** a scanner cannot both be active if there are 8 connections established (DRGN-6543).
- GATTS
  - To conform to the Bluetooth specification there shall not be a secondary service that is not referenced somehow by a primary service. The SoftDevice does not enforce this (DRGN-906, DRGN-2260).

## Known Issues

- If `sd_softdevice_enable()` is called with `fault_handler` set to `NULL`, an invalid function pointer, or a pointer to a returning function, the behavior will be undefined (DRGN-7122).
- If Connection Event Length Extension is enabled, the Radio Notification may be suppressed between connection events (DRGN-7687).
- When `sd_ble_gap_connect()` returns an error code, the scanner may be stopped (DRGN-7679). To ensure the scanner is in a known state, `sd_ble_gap_scan_stop()` should be used to stop the scanner when `sd_ble_gap_connect()` returns an error code.
- Encryption of long link layer packets (payload length > 27 bytes) over 2 Mbps PHY leads to MIC failures and causes the peer to disconnect (DRGN-8356).
- The SoftDevice is incorrectly identified as s132 in the SoftDevice information structure (DRGN-8363).

