

# Release Notes

## Sentrius RS1xx Sensor

### *Version 7.0\_21\_6\_11*

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This document provides release notes for version 7.0\_21\_6\_11 of the Sentrius RS1xx sensor firmware as well as all previous releases.

Release notes are a summary of new and enhanced features, resolved issues and known issues that are not resolved in this version. Consult the User Guide for details on the features of this software release.

- [Software Version 7.0\\_21\\_6\\_11 \(Production Release\)](#)
- [Software Version 6.1\\_20\\_6\\_16 \(Production Release\)](#)
- [Software Version 6.0\\_20\\_3\\_26 \(Production Release\)](#)
- [Software Version 5.7\\_20\\_2\\_12 \(Engineering Release\)](#)
- [Software Version 5.5\\_19\\_11\\_14 \(Engineering Release\)](#)
- [Software Version 5.4\\_19\\_9\\_19 \(Production Release\)](#)
- [Software Version 5.3\\_19\\_8\\_29 \(Engineering Release\)](#)
- [Software Version 5.2\\_19\\_8\\_2 \(Production Release\)](#)
- [Software Version 5.0\\_19-2-5 \(Engineering Release\)](#)
- [Software Version 4.8\\_19- 5-2 \(Engineering Release\)](#)
- [Software Version 4.7\\_19-3-20](#)
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- [Software Version 4.3](#)
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## Software Version 7.0\_21\_6\_11 (Production Release)

Released June 11, 2021

Software part number production releases: 480-0111 (US) / 480-0114 (EU) / 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK) / 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Added support for reading and writing the sensor Friendly Name parameter (Bug 17934)
- No records available response to server request, needed for targeted backlog retrieval (Bug 17696)

### Bug Fixes

- Corrected issue where a change to the Packet Format in use does not update details of the Logging Mode or Logging Duration parameters visible over BLE (Bug 17567)
- Corrected issue where a LoRa Heartbeat LED update rate of 0s would cause a reset upon joining the network when in the Laird 2 Packet Format (Bug 17037)
- Software watchdog issue where LoRa Heartbeat LED update rates of greater than 10s cause uplinks to stop corrected (Bug 17105)
- RTD Sensor variant issue where temperatures were being restricted to 8-bit values corrected (Bug 17203)
- Corrected issue where humidity value could oscillate between 0 and 100% due to internal rollover of the humidity sensor data (Bug 18905)
- Corrected issue where only the last log is captured in Continuous Logging mode when Aggregate Count is greater than one (Bug 19143).
- Corrected issue where duplicate backlogs are stored for Continuous Logging mode in event of disconnection from the LNS (Bug 19144).

### Known Issues

- DFU mode exits after 30s when a BLE connection is active but update not started (Bug 15072)
- Starting the DFU process with no usable upgrade file erases the content of the device (Bug 14765)

## Software Version 6.1\_20\_6\_16 (Production Release)

Released June 18, 2020

Software part number production releases: 480-0111 (US) / 480-0114 (EU) / 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK) / 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Battery Level now displayed as a voltage for the Cayenne packet format (Bug 16765)
- Added Targeted Backlog retrieval where backlog data can be requested within a timestamp range. Note that this does not affect the stored backlog data. It must still be read using the original FIFO or LIFO commands to remove it from the backlogged data (Bug 16458)
- Redundant humidity data has been removed from RTD and One-Wire sensor types for improved display on myDevices Cayenne applications (Bug 16822)

### Bug Fixes

- All releases, with the exception of 480-00030 (AU915, which has no LoRa Alliance formalized test plan for the AU region), have successfully passed LCTT pre-certification conformance testing using the RedwoodComm RWC5020B LoRaWAN Tester. The US915 results provide a close analogy to those expected for the AU915 version (Bug 16398)
- Corrected management of 500kHz uplink channels for AU915 and US915 sensors dependent upon Sub-Band parameter. These are now allocated correctly dependent on the setting of this parameter (Bug 13951)
- Battery Level is now correctly reported to the mobile app for the Cayenne packet format (Bug 16705)
- Advertising format has been adjusted for better compatibility with iOS. Note that the mobile app must be updated for compatibility (v6.5.0) with this format, older mobile app versions will not be able to connect to devices with this and later firmware revisions (Bug 13863, 15435, 16418)
- Open/Closed sensor specific data has been moved to a unique channel for correct display on myDevices Cayenne applications (Bug 16764)

### Known Issues

- DFU mode exits after 30s when a BLE connection is active but update not started (Bug 15072)
- Starting the DFU process with no usable upgrade file erases the content of the device (Bug 14765)
- A LoRa LED update rate of 0 causes the sensor to reset upon join for the Laird 2 Packet Format (Bug 17037)

## Software Version 6.0\_20\_3\_26 (Production Release)

Released March 26, 2020

Software part number production releases: 480-0111 (US) / 480-0114 (EU)

Software part number engineering releases: 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK) / 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Added support for RTD sensor type (Bug 16025)
- Added Sensor Advertise downlink option (Bug 16043)
- Added Sensor Reset downlink option (Bug 16043)
- Added Battery Voltage downlink option and associated uplink message (Bug 12919, 16061, 16266)
- Added Sensor Fault uplink option (Bug 15047)
- Added support for LCTT test mode (Bug 16026)
- Widened random delay performed before rejoin following loss of connection to the Network Server (Bug 15624)
- Added support for backlog retrieval for the Laird 2 Packet Format (Bug 16307)

### Bug Fixes

- Disabled aggregation for Cayenne packet format (Bug 14643)
- Added battery voltage to LoRaMAC DevStatusReq command (Bug 16176)
- Added handling for null data responses from Temperature/Humidity sensor (Bug 16271, 16033)
- Corrected handling of backlog storage where retries were committed to flash memory (Bug 13971)
- Now blocking configuration of invalid timestamp values (Bug 13567, 14265)
- LoRa stack revision now being correctly reported over BLE (Bug 14840, 14116)
- Further enhancements added to ensure external temperature probe reading integrity (Bug 14715)
- Initial packet now being committed to flash in Continuous logging mode (Bug 15913)
- Corrected Battery Voltage measurement across the product working range (Bug 12919, 16061, 16266)

### Known Issues

- ADRACKREQ handling is not LCTT compliant for compatibility with TTN (Bug 13622, 14584, 15025)
- DFU mode exits after 30s when a BLE connection is active but update not started (Bug 15072)
- Starting the DFU process with no usable upgrade file erases the content of the device (Bug 14765)
- AS regions require conformance testing against latest LCTT (Bug 16398)

## Software Version 5.7\_20\_2\_12 (Engineering Release)

Released February 12, 2020

Software part number engineering releases: 480-0111 (US) / 480-0114 (EU) / 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK) / 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Added support for Open/Closed sensor type (Bug 16024)

### Bug Fixes

### Known Issues

## Software Version 5.5\_19\_11\_14 (Engineering Release)

Released November 14, 2019

Software part number engineering releases: 480-0111 (US) / 480-0114 (EU) / 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK) / 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Added Continuous Logging mode where LoRa sensor data is stored to flash (Bug 14392)

### Bug Fixes

### Known Issues

## Software Version 5.4\_19\_9\_19 (Production Release)

Released October 4, 2019

Software part number production releases: 480-0111 (US) / 480-0114 (EU) / 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK)

Software part number engineering releases: 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Creation of new packet format LAIRD2 (Bug 14950)
- In LAIRD2 format the green LED will stay lit for 3s and an initial single data uplink packet will be transmitted after connection on a power reset (Bug 14915)

### Bug Fixes

- Addition of support for unconfirmed packets in the LARD2 format required that the ADRACKREQ code was changed so that the delay waiting for the downlink was tied to how often the bit was set (Bug 15025)
- Timing to remote temperature sensor corrected and temperature values now being correctly reported over the full temperature specification (Bug 15028, 15021, 15029, 15023)

### Known Issues

## Software Version 5.3\_19\_8\_29 (Engineering Release)

*Released August 29, 2019*

Software part number production releases: 480-0111 (US) / 480-0114 (EU) / 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK)

Software part number engineering releases: 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Creation of new packet format LAIRD2 (Bug 14950)
- In LAIRD2 format the green LED will stay lit for 3s and an initial single data uplink packet will be transmitted after connection on a power reset (Bug 14915)

### Bug Fixes

- Now that we support unconfirmed packets in the LARD2 format the ADRACKREQ code was changed so that the delay waiting for the downlink was now tied to how often the bit was set (Bug15025).

### Known Issues

## Software Version 5.2\_19\_8\_2 (Production Release)

*Released August 06, 2019*

Software part number production releases: 480-0111 (US) / 480-0114 (EU) / 480-00025 (AS923-AU) / 480-00030 (AU915) / 480-00035 (AS923-TW) / 480-00036 (AS923-HK)

Software part number engineering releases: 480-00034 (AS923-NZ) / 480-00038 (AS923-SG)

OS: NA

### New or Enhanced Features

- Modified the stack to allow for different versions of firmware to be created for the various countries in the AS923 region. (Bug 13878)
- Modified the stack to meet the dwell time requirements for Taiwan. (Bug 13878)
- Modified the stack so that the EU and AS regions attempt to join at all data rates instead of just the lowest (Bug 13878)
- Exclude channels 0 and 63 in AU915 to meet AU regulatory requirements. (Bug14583)
- The firmware now checks the incoming channel settings for each country within the AS923 region individually so that the sensor cannot be configured with an illegal channel in that country (Bug 14587).
- Added an indication when the external 1-wire sensor is unplugged (error condition). The orange connection status LED will quickly flash three times during the connection status heartbeat indication. When the sensor is reconnected, the error condition is cleared the next time the sensor is read. (Bug 13662).
- The BLE MAC Addr was added to the scan response in the application advertisements (Bug 13870).
- The BLE MAC Addr was added to the DFU Bootloader advertisements (Bug 13867).
- The device name in DFU advertisements was change from DFU Targ to RS1xx DFU.
- The DFU bootloader will only allow updates to versions >= the current version.

### Bug Fixes

- All the new or enhanced features and bug fixes from versions 4.7 and 4.8 below.

## Known Issues

- At the time of release TTN does not support ADR commands for the AS region in V2 of their server. Although it is now possible to join at higher data rates than DR2, it is likely that the data rate will drop to the lowest over time. Therefore, it is still recommended to set the aggregate to 1 for the AS region when using V2 of the TTN server.
- The mobile app incorrectly reports the Bluetooth stack as 4.3.2. This should be 4.4.1. (Bug 14840)

## Software Version 5.0\_19-2-5 (Engineering Release)

*Released February 5, 2019*

Software part number: 480-0111 (RS191) / 480-0114 (RS186)

**OS:** NAs

## New or Enhanced Features

- New stack, version 4.4.1, integrated into the code. The firmware now supports new regions Asia (AS923), India (IN865) and South Korea (KR920) as well as existing regions Europe (EU868) and US (US915) (Bug 13878)

## Bug Fixes

## Known Issues

- Due to the way the new stack handles the Join it is possible with TTI that the module could get stuck at the lowest data rate. In the case of AS923 and US915 this means that an aggregated packet will be too big to transmit. For this engineering release it is advisable to set the aggregate value to 1.

## Software Version 4.8\_19- 5-2 (Engineering Release)

*Released May 2, 2019*

Software part number: 480-0111 (RS191) / 480-0114 (RS186)

**OS:** NA

## New or Enhanced Features

## Bug Fixes

- Temperatures between 0 and -1 degrees were being reported incorrectly. This has been fixed. (Bug 14479)
- Removed the code that forced a confirmed packet every 10 unlinks when using the Cayenne format in unconfirmed mode. This is potentially a short-term fix to get around a problem where the sensor can take several hours to reconnect when a gateway comes back online. Initial investigation is pointing towards this being a gateway/network server issue. This fix has been put in so a customer can validate the RS1xx against other similar sensors. (Bug 14480)

## Known Issues

## Software Version 4.7\_19-3-20

*Released March 20, 2019*

Software part number: 480-0111 (RS191) / 480-0114 (RS186)

OS: NA

### New or Enhanced Features

- Added option to upload logs and alarms to the server Last In First Out (LIFO). The original First In First Out method is still supported (FIFO) (Bug 14226)

### Bug Fixes

- In certain circumstance it is possible that the data rate could change after a packet has been stored in the transmit queue. If that happened the code would enter a loop where it continually reloaded the too big packet and send an unconfirmed packet to the gateway. The code would stay in this loop forever as sending the unconfirmed packet meant the manual watchdog was always getting reset. (Bug 14306)

### Known Issues

- You cannot interchange the upload methods. Once you start uploading logs you must complete the process with that method until all the logs are uploaded or the Flash is reformatted. If the methods are interchanged there is a risk that some logs could be lost.

## Software Version 4.5\_19-1-2

*Released January 2, 2019*

Software part number: 480-0111 (RS191) / 480-0114 (RS186)

OS: NA

### New or Enhanced Features

- We can now update the bootloader over a BLE and UART connection. (Bugs 13866 and 13930)

### Bug Fixes

- Fixed GPIO mapping in the bootloader file (Bug 13837)
- Internal GPIO interrupts would not trigger once we started monitoring the UART Rx line. (Bug 13937)
- Current now falls to 7uA after uploading new firmware. (Bug 13792)

### Known Issues

As below.

## Software Version 4.4\_18-10-17

*Released October 17, 2018*

Software part number: 480-0111 (RS191) / 480-0114 (RS186)

OS: NA

### New or Enhanced Features

- RTC requested immediately on connection and not on first data packet. (Bug 13613)
- Now periodically sets the ADRAckReq bit in an uplink data packet to trigger the TTI server to send an ADR command. This should not be required but fits in with TTI's implementation of the specification. (Bug 13622)
- Immediately after joining the sensor now sends an extra uplink packet containing version information. (Bug 13613)

### Bug Fixes

- RTC not reset on failed reconnect., (Bug 13612)
- Previous configuration variables now retained from version 3.x to 4.x. (Bug 13569)
- Switch of HCLK when OneWire device isn't present. This reduces the standby current from 40uA back down to 7uA. (Bug 13621)

### Known Issues

As below:

- After an upgrade the doze mode current stays at 4.5mA unless power cycled, and Bug 13792 is raised.

## Software Version 4.3

*Released September 24, 2018*

Software part number: 480-0111 (RS191) / 480-0114 (RS186)

OS: NA

### New or Enhanced Features

- Split LED and manual watchdog timer. (Bug 13348)
- Extended watchdog timeout by a factor of 3.
- The sensor will now restart after disconnecting from Bluetooth if a setting had changed. (Bug 13436)
- Decrease the amount of time it will take for the manual watchdog timer to reset the module. (Bug 13361)

### Bug Fixes

- First uplink packet now sent at the currently loaded data rate and not the hardcoded value. (Bug 13403)
- Reduce power consumption by only performing temperature check once instead of twice. (Bug 13490)
- When configured for the Cayenne format if the decimal part of the humidity reading was x.0 it was incremented to x.5. (Bug 13436)
- When configured for the Cayenne format the sensor couldn't transmit confirmed uplinks. (Bug 13489)
- No longer include the time it takes to access the TxDone interrupt when calculating the Rx window opening times. (Bug 13535)
- Fixed the code that checks if there is anything connected to the UART CTS line before configuring the Uart. (Bug 13385)

### Known Issues

As below.



## Software Version 4.2

*Released September 5, 2018*

**Software part number:** 480-0111 (RS191) / 480-0114 (RS186)

**OS:** NA

### New or Enhanced Features

- Add support for one wire external temperature sensor probe.
- RTC time now requested via options byte in a data packet.
- Add support for changing LoRa packet format to support off the shelf app servers.
- Add support to enable/disable confirmed packets.
- Added software watchdog timer to reset the sensor if it is not working as expected.
- Bit 3 of the options byte is used to indicate if the sensor has reset.
- Hold user button for 5 seconds to reset the sensor.

### Bug Fixes

No new bugs reported.

### Known Issues

- There is an issue if you are changing one or more of the ids (DevEui, AppEui, AppKey, etc.). A change to any of these parameters forces the sensor to rejoin the network. This rejoin is triggered when the next sensor reading would be due. If any of the ids haven't been updated by this point, the sensor will enter a loop where it will just continually attempt to join the network with the wrong parameters and so will fail in the attempt. The only way out of this state is to reboot the sensor by removing the batteries.
- No temperature or humidity data will be output over BLE to the mobile app unless there is first a LoRa connection established.
- Bug 13348 – The software watchdog timer is tied to the LED flash period. If the LED flash period is set to low, the sensor may reset before it can send any data.

## Software Version 4.0

*Released August 2018*

**Software part number:** 480-0111 (RS191) / 480-0114 (RS186)

**OS:** NA

### New or Enhanced Features

- Users can now select the format of the uplink data packet in order to meet the requirements of the Cayenne application server. The original packet format from version 3.1 is included under the Laird option.
- User can configure the sensor to transmit unconfirmed uplink packets using the Cayenne packet format. The Laird format can only transmit confirmed uplink packets.

### Known Issues

- There is an issue if you are changing one or more of the ids (DevEui, AppEui, AppKey, etc.). A change to any of these parameters forces the sensor to rejoin the network. This rejoin is triggered when the next sensor reading would be due. If any of the ids haven't been updated by this point, the sensor will enter a loop where it will just continually attempt to join the network with the wrong parameters and so will fail in the attempt. The only way out of this state is to reboot the sensor by removing the batteries.
- No temperature or humidity data will be output over BLE to the mobile app unless there is first a LoRa connection established.

### Bug Fixes

- Negative temperature values were being reported incorrectly. This bug had not been previously reported but has now been fixed. (Bug 13247)

## Software Version 3.1

*Released October 2017*

**Software part number:** 480-0111 (RS191) / 480-0114 (RS186)

**OS:** NA

### New or Enhanced Features

- Initial RS1xx firmware release

### Known Issues

#### Firmware

- None.