RSL10 SDK Release Notes - 2.0

April 11, 2018

> **Only these Release Notes have changed**
> We added two known issues; see information about the Java version and CEVA GAP documentation below.

RSL10 is a Bluetooth® 5 certified multi-protocol radio SOC that brings the industry's lowest power Bluetooth low energy technology to wireless applications. The RSL10 Software Development Kit (SDK) includes the firmware, software and documentation needed to evaluate this chip and develop applications based on RSL10.

This document lists new features in this release, describes known issues, and points you to more information so you can start using the product.

What's New

This SDK installation provides Oxygen Eclipse, a more recent IDE than the Kepler Eclipse previously provided. It includes an upgrade to version 6.3.1 of the GNU Arm® Embedded Toolchain. Besides providing the benefits of a newer Eclipse version, this installation has the added benefit of a seamless migration of code that was written for RSL10 SDK Release 1.4.

Furthermore, this release provides an Arm CMSIS-Pack for Oxygen that you can add to the SDK installation if you are accustomed to working in a CMSIS-Pack environment.

Summary	Release Notes
Replace the Evaluation and Development Board manual with a link to the one on the public website	The Evaluation and Development Board manual is available from www.onsemi.com. For your convenience, a PDF with a link to the manual has been placed in the *documentation* folder and the *Documentation.zip* file.
Changed "Evaluation and Development Kit" to "Software Development Kit"	The software product installed for RSL10 support has changed its name from "Evaluation and Development Kit (EDK)" to "Software Development Kit (SDK)" to be consistent with the industry practice of naming these types of software development tools.
C startup logic can be accelerated by using the Flash copier block & DMA Channel	*start.c* has been changed to use the Flash Copier and DMA to consume less energy to copy the data memory, and to reset the BSS memory section in the startup.
[CMSIS-Driver] Implementation of I2C Driver and sample application	Added an I2C CMSIS-Driver and sample application in the *source/samples/i2c_cmsis_driver* folder. See the *RSL10 Sample Code User's Guide* for more information.
[CMSIS-Driver] Implementation of SPI Driver and sample application	Added a CMSIS-Driver and sample application for the SPI interface in the *source/samples/spi_cmsis_driver* folder. See the *RSL10 Sample Code User's Guide* for more information.
[CMSIS-Driver] Implementation of UART Driver and sample application	Added a CMSIS-Driver and a sample application for the RSL10 UART in the *source/samples/uart_cmsis_driver* folde r. See the *RSL10 Sample Code User's Guide* for more information.
Improved ability for iPhones to reconnect	The stack accepts the termination reason of "CONNECTION LIMIT EXCEEDED" from an application.
Indicating when an LEA event is not programmed	When a secondary LEA event cannot be programmed in scatter net use cases, then an LEA audio IRQ is raised to inform the application, but not with valid audio. The IRQ happens earlier than the time of the expected secondary event but after the primary event.

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Bug Fixes

Summary	Release Notes
Fixes applied to the Bluetooth low energy applications	• In peripheral_server_bond, NVR2 is no longer being erased at beginning of the code. • TX power is now being set in hci_app. • In sleep and standby applications, the clock accuracy has been corrected from 20 ppm to 500 ppm
Fixes applied to the Bluetooth low	• The RX window in connection parameter updates was opening too early and now starts at the right time. It saves on

energy stack	power consumption. • During connection establishment, if the first anchor points were missed, connection establishment was not possible; now the connection is established. • The RX window now widens when a 20 ppm clock is used. • During numeric comparison pairing, the application was pairing successfully although it did not send verification confirmation from the user. Now it fails appropriately. • The scan duration is now consistent with the GAP documentation, changing from 7s to 10s. • In advertisement indications, RSSI is now reported as a signed value. • The RX window was widened too much during the connection establishment and connection parameter update. Now it conforms to the specification. • Using DTM in an application is stable, and commands can be received/sent from/to a tester through a communication interface such as I2C. • The heap memory of kernel messaging and the attribute database has been increased to allow adding more attributes in one service. • The handling of non-32768 Hz low power clock in the stack is modified to resolve the problem of randomly missing events. • The application can now replace the sum of clock accuracy of the slave and master devices of a BLE link with its own desired value. It helps to cope with variations of RC oscillator clock accuracy.
remote_mic_coex application audio and advertising are fixed	*remote_mic_rx_coex* used to be interrupted when audio was sent from *remote_mic_tx_coex*. Now the receiver continues to receive data. Also, when the device is advertising and listening to an audio stream, advertisement does not stop.
Signal-to-Noise Ratio improved for the ASRC	The SNR performance of the ASRC when the input signal is above 0.5 full scale has been improved by using mode-1 instead of mode-2.
Sys_RFFE_SetTXPower() now outputs the correct RF TX power	Modified the Sys_RFFE_SetTXPower function to drive more accurate TX power output if a calibrated RSL10 is used.
The SPI sample code can now successfully do the comparison operation	The system clock on the SPI slave side has been adjusted so that it can catch the data stream to do the comparison operation.
The mechanism to generate seed point of srand for Bluetooth low energy is truly random	The seed point for the *rand* function of the stack can be set by the application to be able to generate a truly random key.
Fixed the multi-link simultaneous connection failure with the central_client_bond Release configuration	The *central_client_bond* application no longer fails to connect to devices when multiple devices try to connect and bond to it at the same time. In previous releases, for the release build configuration, bonding had to complete before a second device could attempt to bond to the application.
Remote Microphone Transmit: fixed the Release version to finish the LPDSP32 initialization	The Release version of the *remote_mic_tx_raw* sample application is now functional. Replacing the linker script file is no longer necessary.
Connection parameters fixed for remote microphone RX coex	When *remote_mic_rx_coex* was listening in audio stream mode and it had a Bluetooth connection, Bluetooth connection parameter updates were not possible. Also, if the Bluetooth link disconnected, it could connect to some master devices but not all of them while it was in audio listening mode. Now, it can connect to both Android phones and iOS devices even while in audio listening mode.
MASS_ERASE call removed from standalone flash loader	The standalone and open flash loaders were updated to avoid inconsistent behavior when flash redundancy sectors are in use.
EraseAll/VerifyAll fixed for standalone flash loader	The VerifyAll operation of the standalone flash loader has been updated to match the EraseAll operation. From now on, both operations verify only the main area of flash.
Direct Test Mode (DTM) script now calculating packet errors correctly and is using the physical radio channel number	The DTM script has been changed to calculate PER correctly for 2 Mbps. Also the channels numbers that are entered in a DTM script are expected to be radio physical channel numbers, and the DTM script does not apply any conversion to the number when it sends a DTM command.

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Migrating from RSL10 SDK 1.4 to 2.0

You do not have to make any changes to your Release 1.4 code or projects to work with them in SDK 2.0.

Known Issues

The following issues are known to be outstanding in release 2.0

Summary	Release Notes

SDK does not launch with Java SE 10	If you have Java SE 10 installed, the Oxygen Eclipse-based IDE will not work. You must install Java version 9 or 8.
Adjust the Sys_RFFE_SetTXPower function for uncalibrated boards	Transmission power is not properly generated for 1dBm to 6 dBm for uncalibrated boards.
XTAL 48MHz start up time needs to be increased	When the RC oscillator is used as the source of the low power clock, the Bluetooth low energy connection with the sleep application is not very stable and sometimes a disconnection is observed. To alleviate the issue and also account for board to board variation, the wake-up delay for this case has been increased from 1.1 ms to 1.3 ms.
Wrong identity address type in pairing procedure	When controller privacy is used, address identity type is not set correctly, causing pairing failure for iPhone and some versions of Android.
Only pairing and bonding have been implemented in the "ble" driver	For the ble_peripheral_server_bond sample application, its “ble” driver can support pairing with a central device to set up an encrypted connection, and bonding by storing that connection information so that the link’s encryption information can be re-used later on. However, other features of this driver (e.g., white-listing, private resolvable addressing, scanning, etc.) have not been fully implemented and tested. They will be available in future releases.

Delay needed in the remote_mic_rx_raw sample application for PCM input	To have good audio quality for PCM input, add a delay in the ASRC_out DMA interrupt. Use a delay instruction in the `DMA_IRQ_FUNC( ASRC_OUT_IDX)(void)` function in *app_func.c* as shown below:
	`#if (INPUT_INTRF == PCM_RX_RAW_INPUT)`
	`Sys_Delay_ProgramROM(100);`
	`#endif`

Remote Mic TX: smaller sub-frame causes noisy right channel	Choosing a SUBFRAME that is less than 32 samples for the PCM port in the Stereo Raw Audio Stream Broadcast Transmitter Custom Protocol sample application (*remote_mic_tx_raw*) causes periodic noise on the right channel.
Investigate increase in latency for custom_protocol_trx	Configuring the RX output to SPI will cause an extra 1.5 ms increase in the end-to-end latency. Now, it is 8.6 ms but it is supposed to be 7 ms.
CEVA GAP documentation updated incorrectly	When the GAP (RW-BLE-GAP-IS_2mbps) interface specification documentation was updated, it described a DTM API that is not available in this release.
Investigating spurious emissions for the remote mic protocol	The remote microphone protocol implementation on the transmitter side has spurious emission violation non-conformance with regulatory tests.
Installer fails if the path is too long	If the installation path is longer than 50 characters, the installer fails with an error specifying which path is too long. When the installer tries to install some of the subfolders, the entire path length exceeds the maximum allowed by Windows. If you choose a location that is different from the default installation location, ensure that it does not exceed 50 characters.
Remote microphone performance needs further evaluation	The audio stream broadcast custom protocol has not been fully characterized.

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Further Reading

See "Getting Started with RSL10" in the *Documentation.zip* archive and the installed *documentation* folder to discover:

- How to install the software development tools
- How to connect to the Evaluation and Development Board
- How to run a simple sample application that shows the board is working
- An overview of the documentation set

Release Organization

Release Item	Description
RSL10_SDK.zip	Contains the Getting Started guide, installer for the standard RSL10 IDE (Oxygen Eclipse), and the CMSIS-Pack for Oxygen
Documentation.zip	All manuals in one folder that can be accessed without installing or starting an IDE
RSL10_Utility_Apps.zip	Contains utility applications and external projects that can be used to help demonstrate and test the functionality of the RSL10 Evaluation and Development Board: ■ Standalone Flash Loader ■ Ezairo 7100-based sample audio applications
RSL10_LPDSP32_Support.zip	Startup files, Eclipse project files, a utility to integrate LPDSP32 output code with Arm Cortex®-M3 processor code, a test suite, and documentation

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