Freescale Semiconductor
Release Notes

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Freescale IEEE® 802.15.4 Software for the KW01 Wireless Microcontroller, Version 5.1.3

Release Notes

1 Overview

These release notes pertain to the software that was developed for the Kinetis KW01 wireless microcontroller. These notes pertain to the KW01 IEEE 802.15.4 Software version 5.1.3.

Contents

2 Release Contents

The Freescale KW01 IEEE 802.15.4 software version 5.1.3 release contents are listed in the table below.

Table 1. Release Contents

(File | Folder) Name	Description
app\ieee_802_15_4\MAC_FSCI_app	MAC Freescale Serial Connectivity Interface (FSCI) application
app\ieee_802_15_4\MAC_TSCH_Demo	MAC TSCH demo application
app\ieee_802_15_4\MAC_LE_Demo	MAC Low Energy demo application
app\ieee_802_15_4\MyStarNetwork	MyStarNetwork embedded demo application
app\ieee_802_15_4\MyWirelessApp	MyWirelessApp demo application
ieee_802_15_4\Lib	IEEE 802.15.4-2006 compliant MAC IEEE 802.15.4e Time Slotted Channel Hopping(TSCH) MAC services IEEE 802.15.4e Coordinated Sampled Listening (CSL) MAC services IEEE 802.15.4e Receiver Initiated Transmission (RIT) MAC services

ieee_802_15_4\Source\Phy	• KW01 IEEE 802.15.4g sub-Gigahertz MR-FSK SUN PHY with five distinct operating band plans:
	  • 863-870 MHz – Europe, mode #1 and #2
	  • 902-928 MHz – US, mode #1 and #2
	  • 920-928 MHz – Japan, mode #1 and #2 plus 3 custom modes defined by ARIB std108, page 92
	  • 470-510 MHz – China, mode #1
	  • 779-787 MHz – China, mode #1

doc	Connectivity documentation
framework\Common	Connectivity Framework common files
framework\FSCI	Freescale Serial Connectivity Interface
framework\LPM	Low Power Module
framework\MemManager	Memory Manager
framework\Messaging	Messaging API
framework\NVM	Non Volatile Memory support
framework\Panic	Panic module
framework\RNG	Random Number Generator wrapper
framework\SerialManager	Serial Manager for various interface
framework\Shell	Shell/Console module
framework\TimersManager	Timers Manager module
framework\Utils\SecLib	Security Library
drv\Portable	Abstractions for peripheral drivers

2.1 List of Pre-compiled Binaries

The *tools\binaries* folder contains the following pre-compiled binaries:

frdmkw01_mac_fsci_app_eu.bin – MAC FSCI app for EU band for FRDM-KW019032
*frdmkw01_mac_fsci_app_jp.*bin – MAC FSCI app for JP band for FRDM-KW019032
frdmkw01_mac_fsci_app_us.bin – MAC FSCI app for US band for FRDM-KW019032
frdmkw01_mwa_coord_eu.bin – MAC MyWirelessApp coordinator for EU band for FRDM-KW019032
frdmkw01_mwa_coord_jp.bin – MAC MyWirelessApp coordinator for JP band for FRDM-KW019032
frdmkw01_mwa_coord_us.bin – MAC MyWirelessApp coordinator for US band for FRDM-KW019032
frdmkw01_mwa_ed_eu.bin – MAC MyWirelessApp ED for EU band for FRDM-KW019032
frdmkw01_mwa_ed_jp.bin – MAC MyWirelessApp ED for JP band for FRDM-KW019032
frdmkw01_mwa_ed_us.bin – MAC MyWirelessApp ED for US band for FRDM-KW019032
usbkw01_sniffer_eu.bin – Packet sniffer KW01 firmware for USB-KW019032 for the EU band CSM
usbkw01_sniffer_jp.bin – Packet sniffer KW01 firmware for USB-KW019032 for the JP band CSM
usbkw01_sniffer_us.bin – Packet sniffer KW01 firmware for USB-KW019032 for the US band CSM

Detailed information about the release contents can be found in the *connsw_manifest.xml* file included in this package.

Please refer to www.freescale.com/connectivity for more information on Freescale 802.15.4 platforms.

3 Features Added Since Last Release

The features added since the last public release for KW01 are listed below:

- FRDM-KW019032 and USB-KW019032 board support
- Kinetis SDK v1.3 integration
- FSCI host support on the K22F MCU on USB-KW019032
- IEEE® 802.15.4-2011 MAC security support

4 Software Deployment Considerations

- IAR Embedded Workbench for ARM® v7.40.2 was used to build and test the IDE projects included in this release.
- This release contains Freescale Kinetis SDK v1.3 sources. The SDK is required for the MQX and FreeRTOS kernels and the peripheral drivers configured for the supported boards.
- The MAC/PHY applications have some source and include paths relative to the Kinetis SDK v1.3 folder, through the *KSDK130_FWK513_PATH* environment variable. This variable is automatically set by the installer of this package.
- This package contains the MyStarNetwork PC application used to interact with the corresponding embedded demonstration applications. Please refer *Freescale IEEE 802.15.4 MACPHY Demo Applications User's Guide.pdf* and *MyStarNetworkDemo.chm* for more information**.**
- The *ConnSw\tools\binaries* folder contains pre-compiled binaries, ready to flash for example applications. It also contains a set of USB-KW019032 binaries for protocol sniffing functionality for the various supported bands.
- The package contains a project cloner Windows® executable in the *ConnSw\tools\project_cloner* folder, which allows copying to a chosen location the example applications files that are likely to be modified by the user, such as IDE projects and configuration headers. It is recommended to use this cloner instead of opening directly the IDE projects from the installation folder, so as to preserve the original installation files for future use.
- This release is compatible with the Freescale Test Tool for Connectivity Products.

5 Embedded System Considerations

- This package supports the following board setups: FRDM-KW019032, USB-KW01Z9032 and MRB-KW01
- The MRB-KW01 is configured to be connected as a daughter card for the TWR-RF board
- The FRDM-KW019032 and USB-KW9032 boards feature a composite USB device called OpenSDA which serves as debugger interface and as USB to serial converter via a virtual COM port application. Several firmware images can be programmed on the OpenSDA device, among which:

  http://developer.mbed.org/handbook/CMSIS-DAP

  https://www.segger.com/opensda.html

  http://www.pemicro.com/opensda/

6 Known Limitations

- This release supports only the IAR Embedded Workbench toolchain, the MQX and FreeRTOS kernels and a bare-metal scheduler. Other RTOSes and toolchains supported in the KSDK have not been tested with this release.
- The IEEE 802.15.4g PHY Service Data Unit (PSDU) is limited to 254 bytes.
- The IEEE 802.15.4 support included in this release does not include slotted/beacon enabled mode.
- For the Japanese 920-928 MHz PHY band, it is recommended to use the MRB-KW01 board with a 30 MHz crystal resonating element, due to the frequency synthesis with a 32 MHz crystal generates some spurious emissions towards the upper end of the band.
- The Indian band (865-867 MHz) with 3 distinct PHY modes (1.2 kbps, 20 kbps and 100 kbps) has undergone limited testing and is provided without any warranty, as an example of how to configure custom PHY modes.

7 Documentation Included in this Package

The following connectivity-supporting documentation is included in this package:

CONNFWKRM.pdf	– Connectivity Framework API Reference Manual
802154MPADG.pdf	– MAC Application Developer's Guide
802154MPAPIRM.pdf	– MAC and PHY API Reference Manual
MACPHY_Quick_Start_Guide.pdf	– Quick Start Guide for this package
802154MPDAUG.pdf	– MAC and PHY Demo Applications User's Guide

The package also includes extensive Kinetis SDK v1.3 documentation in the "*KSDK_1.3.0/doc*" folder.

8 Memory Footprints of MAC Libraries and MAC Layer Applications

8.1 MAC Libraries Memory Footprints

Target Board/Platform: KW01 (IAR Embedded Workbench compiler)				
Component/ Application	**Memory Footprint (bytes)**			**Description**
	READ ONLY CODE	**READ ONLY DATA**	**READ/WRITE**	
Freescale_802.15.4_MAC_06eTSCHg_M0_IAR.a	29718	59	14	MAC 2006 compiled with TSCH functionality
Freescale_802.15.4_MAC_06eLEg_M0_IAR.a	29 516	27	14	MAC 2006 compiled with CSL and RIT functionality
Freescale_802.15.4_MAC_06g_M0_IAR.a	21 728	27	14	MAC 2006 compiled with non-beacon functionality
Freescale_802.15.4_MAC_11eTSCHg_M0_IAR.a	29 878	59	14	MAC 2011 compiled with TSCH functionality
Freescale_802.15.4_MAC_11eLEg_M0_IAR.a	29 676	27	14	MAC 2011 compiled with CSL and RIT functionality
Freescale_802.15.4_MAC_11g_M0_IAR.a	21 904	27	14	MAC 2011 compiled with non-beacon functionality

8.2 Application Sizes Using FreeRTOS

Target Board/Platform: FRDM-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	**Code Size (bytes)**	**Data Size (bytes)**		**Comments**
	READ ONLY	**READ ONLY**	**READ/WRITE**	
FSCI Application	67917	502	13032	Default platform configuration
MyStarNetwork Demo Coordinator	58160	595	12594	Default platform configuration
MyStarNetwork Demo EndDevice	56922	945	12615	Default platform configuration
MyWirelessApp Demo Coordinator	56594	516	12542	Default platform configuration
MyWirelessApp Demo EndDevice	56522	851	12590	Default platform configuration
MyWirelessApp Demo Coordinator SE	57146	556	12542	Default platform configuration
MyWirelessApp Demo EndDevice SE	56974	951	12582	Default platform configuration
MAC_LE_Demo Coordinator	58032	409	13186	Default platform configuration
MAC_LE_Demo EndDevice	61656	457	12987	Default platform configuration
MAC_TSCH_Demo Coordinator	58735	455	13174	Default platform configuration
MAC_TSCH_Demo EndDevice	59471	495	13206	Default platform configuration

Target Board/Platform: MRB-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	67901	502	13028	Default platform configuration
MyStarNetwork Demo Coordinator	58144	596	12590	Default platform configuration
MyStarNetwork Demo EndDevice	56908	944	12611	Default platform configuration
MyWirelessApp Demo Coordinator	56580	515	12538	Default platform configuration
MyWirelessApp Demo EndDevice	56508	850	12586	Default platform configuration
MyWirelessApp Demo Coordinator SE	57132	555	12538	Default platform configuration
MyWirelessApp Demo EndDevice SE	56960	950	12578	Default platform configuration
MAC_LE_Demo Coordinator	58020	409	13182	Default platform configuration
MAC_LE_Demo EndDevice	61640	458	12983	Default platform configuration
MAC_TSCH_Demo Coordinator	58725	453	13170	Default platform configuration
MAC_TSCH_Demo EndDevice	59461	493	13202	Default platform configuration

Target Board/Platform: USB-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	67541	440	13020	Default platform configuration
MyStarNetwork Demo Coordinator	57768	534	12582	Default platform configuration
MyStarNetwork Demo EndDevice	56532	882	12603	Default platform configuration
MyWirelessApp Demo Coordinator	56202	455	12538	Default platform configuration
MyWirelessApp Demo EndDevice	56132	788	12578	Default platform configuration
MyWirelessApp Demo Coordinator SE	56754	495	12538	Default platform configuration
MyWirelessApp Demo EndDevice SE	56584	888	12570	Default platform configuration
MAC_LE_Demo Coordinator	57856	371	13174	Default platform configuration
MAC_LE_Demo EndDevice	61264	396	12983	Default platform configuration
MAC_TSCH_Demo Coordinator	58559	417	13162	Default platform configuration
MAC_TSCH_Demo EndDevice	59143	433	13202	Default platform configuration

Target Board/Platform: USB-K22F (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
MyWirelessApp Demo Coordinator FSCI Host	37163	882	41056	Default platform configuration
MyWirelessApp Demo EndDevice FSCI Host	37331	876	41056	Default platform configuration

8.3 Application Sizes Using MQX

Target Board/Platform: FRDM-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	68464	641	13232	Default platform configuration
MyStarNetwork Demo Coordinator	58699	729	12822	Default platform configuration
MyStarNetwork Demo EndDevice	57479	1077	12843	Default platform configuration
MyWirelessApp Demo Coordinator	57143	648	12778	Default platform configuration
MyWirelessApp Demo EndDevice	57087	997	13682	Default platform configuration
MyWirelessApp Demo Coordinator SE	57707	688	12778	Default platform configuration
MyWirelessApp Demo EndDevice SE	57519	1207	12811	Default platform configuration
MAC_LE_Demo Coordinator	58423	543	13414	Default platform configuration
MAC_LE_Demo EndDevice	61987	591	13983	Default platform configuration
MAC_TSCH_Demo Coordinator	59124	587	13402	Default platform configuration
MAC_TSCH_Demo EndDevice	59872	627	13438	Default platform configuration

Target Board/Platform: MRB-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	68448	640	13228	Default platform configuration
MyStarNetwork Demo Coordinator	58683	728	12818	Default platform configuration
MyStarNetwork Demo EndDevice	57463	1076	12839	Default platform configuration
MyWirelessApp Demo Coordinator	57127	647	12774	Default platform configuration
MyWirelessApp Demo EndDevice	57071	996	13678	Default platform configuration
MyWirelessApp Demo Coordinator SE	57673	689	12774	Default platform configuration
MyWirelessApp Demo EndDevice SE	57503	1206	12807	Default platform configuration
MAC_LE_Demo Coordinator	58407	543	13410	Default platform configuration
MAC_LE_Demo EndDevice	61971	590	13979	Default platform configuration
MAC_TSCH_Demo Coordinator	59124	587	13398	Default platform configuration
MAC_TSCH_Demo EndDevice	59854	628	13434	Default platform configuration

Target Board/Platform: USB-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	68084	578	13224	Default platform configuration
MyStarNetwork Demo Coordinator	58323	666	12814	Default platform configuration
MyStarNetwork Demo EndDevice	57083	1014	12835	Default platform configuration
MyWirelessApp Demo Coordinator	56747	584	12770	Default platform configuration
MyWirelessApp Demo EndDevice	56691	934	13674	Default platform configuration
MyWirelessApp Demo Coordinator SE	57295	624	12770	Default platform configuration
MyWirelessApp Demo EndDevice SE	57123	1144	12803	Default platform configuration
MAC_LE_Demo Coordinator	58247	505	13406	Default platform configuration
MAC_LE_Demo EndDevice	61591	528	13975	Default platform configuration
MAC_TSCH_Demo Coordinator	58948	549	13394	Default platform configuration
MAC_TSCH_Demo EndDevice	59540	565	13430	Default platform configuration

Target Board/Platform: USB-K22F (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
MyWirelessApp Demo Coordinator FSCI Host	46483	1219	22848	Default platform configuration
MyWirelessApp Demo EndDevice FSCI Host	46675	1230	23360	Default platform configuration

8.4 Application Sizes Using bare-metal

Target Board/Platform: FRDM-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	62881	493	6420	Default platform configuration
MyStarNetwork Demo Coordinator	53124	587	5998	Default platform configuration
MyStarNetwork Demo EndDevice	51892	935	6019	Default platform configuration
MyWirelessApp Demo Coordinator	51564	506	5950	Default platform configuration
MyWirelessApp Demo EndDevice	51492	841	5994	Default platform configuration
MyWirelessApp Demo Coordinator SE	52116	546	5950	Default platform configuration
MyWirelessApp Demo EndDevice SE	51944	941	5986	Default platform configuration
MAC_LE_Demo Coordinator	53216	401	6590	Default platform configuration
MAC_LE_Demo EndDevice	56788	449	6395	Default platform configuration
MAC_TSCH_Demo Coordinator	53925	445	6578	Default platform configuration
MAC_TSCH_Demo EndDevice	54661	485	6614	Default platform configuration

Target Board/Platform: MRB-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	62865	494	6416	Default platform configuration
MyStarNetwork Demo Coordinator	53108	588	5994	Default platform configuration
MyStarNetwork Demo EndDevice	51876	936	6015	Default platform configuration
MyWirelessApp Demo Coordinator	51548	507	5946	Default platform configuration
MyWirelessApp Demo EndDevice	51476	842	5990	Default platform configuration
MyWirelessApp Demo Coordinator SE	52100	547	5946	Default platform configuration
MyWirelessApp Demo EndDevice SE	51928	942	5982	Default platform configuration
MAC_LE_Demo Coordinator	53204	401	6586	Default platform configuration
MAC_LE_Demo EndDevice	56772	450	6391	Default platform configuration
MAC_TSCH_Demo Coordinator	53913	445	6574	Default platform configuration
MAC_TSCH_Demo EndDevice	54649	485	6610	Default platform configuration

Target Board/Platform: USB-KW01 (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
FSCI Application	62505	432	6412	Default platform configuration
MyStarNetwork Demo Coordinator	52732	526	5990	Default platform configuration
MyStarNetwork Demo EndDevice	51500	874	6011	Default platform configuration
MyWirelessApp Demo Coordinator	51172	445	5942	Default platform configuration
MyWirelessApp Demo EndDevice	51100	780	5986	Default platform configuration
MyWirelessApp Demo Coordinator SE	51724	485	5942	Default platform configuration
MyWirelessApp Demo EndDevice SE	51552	880	5978	Default platform configuration
MAC_LE_Demo Coordinator	53040	363	6582	Default platform configuration
MAC_LE_Demo EndDevice	56396	388	6387	Default platform configuration
MAC_TSCH_Demo Coordinator	53749	407	6570	Default platform configuration
MAC_TSCH_Demo EndDevice	54333	423	6606	Default platform configuration

Target Board/Platform: USB-K22F (IAR Embedded Workbench compiler)				
Component/ Application	Code Size (bytes)	Data Size (bytes)		Comments
	READ ONLY	READ ONLY	READ/WRITE	
MyWirelessApp Demo Coordinator FSCI Host	36887	861	19776	Default platform configuration
MyWirelessApp Demo EndDevice FSCI Host	37055	858	19776	Default platform configuration

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