



ABSTRACT

WiLink8 is a combo device supporting Wi-Fi®, Bluetooth® (BT) and Bluetooth low energy (BLE) functionality on a single chip for universal connectivity. The device supports IEEE 802.11 a,b,g,n bands along with Bluetooth 5.1 and BLE. This along with the open source stack for Wi-Fi and Linux BlueZ stack for Bluetooth/Bluetooth low energy makes a complete solution package. These solutions are reliable, easy to use, and allow flexibility to choose from a number of application processors with a royalty-free software stack. This getting started guide provides an overview of the device features and available resources to jump start development and prototyping.

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1 Product Features

General features supported by WiLink8 family of devices and modules are listed below. More details are available at [WiLink™ technology solutions](#).

1.1 Generic WiLink8™ Features

- WLAN, Bluetooth, Bluetooth low energy on a single chip provide universal connectivity
- Fully certified for FCC, CE, IC, and Telec pin-to-pin compatible modules
- WL1801 and WL1831 flavor is offered both as module and wafer scale package chipdown for design flexibility
- Seamless integration with TI Sitara™ and other application processors
- Pre integrated drivers with TI Sitara processor SDK offering
- Consumer and industrial temperature range support
- Automotive grade AEC-Q100 chips available

1.2 Wi-Fi Features

- Linux open-source Wi-Fi package
- TI NLCP releases are Wi-Fi Alliance per-certified
- IEEE: 802.11 a,b,g,n, 2X2 MIMO @ 2.4 GHz and antenna diversity @ 5 GHz
- Supported Modes: STA, AP, P2P, Wi-Fi Direct, Wi-Fi Mesh
- SDIO interface for WLAN
- Up to 100 Mbps UDP throughput
- Security: **WPA3**, WMM-PS, WMM-AC, WPA/2PSK, Ent,WPS,WPSv2
- Low power support: Station WoW & Suspend/Resume , AP ELP (800 µA idle connect)
- Co-existence with other 2.4 GHz protocol: Bluetooth/Bluetooth low energy and TI ZigBee® at 2.4 GHz
- AP DFS, radar detection at 5 GHz
- Multi Role Multi Channel: concurrent operation of 2 WLAN roles on a single device.
- Wi-Fi over mesh support: open 802.11s
- Windows, RTOS, and Android support via 3rd party
- FIPS 140-2 Level 1 validation

For a complete list of Wi-Fi features and performance, see the [WiLink™ 8 WLAN Features User's Guide](#).

1.3 BlueTooth/Bluetooth low energy Features

- Bluetooth BR/EDR and LE support
- Bluetooth 5.1 controller sub-system certification
- HCI transport for BlueTooth/Bluetooth low energy over UART

1.4 Acronyms Used in This Document

| Acronym | Definition |
|---------|---|
| BLE | Bluetooth low energy |
| BR | Basic Rates |
| BT | Bluetooth |
| DID | Declaration Identification Number for BTSIG |
| EDR | Enhanced Data Rate |
| HW | Hardware |
| IO | Input/Output |
| MIMO | Multiple Input, Multiple Output |
| MRC | Maximum Ratio Combining ; supported at 2.4-GHz 802.11g/n only |
| SISO | Single Input, Single Output |
| SW | Software |
| WoW | Wake on WLAN |
| WLAN | Wireless Local Area Network |

2 WiLink8 Variants

[Table 2-1](#) lists available WiLink8 modules and devices from Texas Instruments. The link for each device contains the data sheet and associated documentation. The module or device selection can be made based on desired technology needed for end application.

The choice of modules vs chipdown depends on several factors. The modules provide the advantage of low hardware design efforts and certification efforts. On the other hand a one time investment in chipdown hardware design and certification offers added cost benefits for mass production.

The below table contains the links to product pages of modules and WiLink8 chip wherever applicable.

Table 2-1. WiLink8 Variants Table

| Module | Antennas Supported | Wi-Fi | | | Bluetooth 5.1/ Bluetooth low energy | FIPS 140-2 Validation |
|---|--------------------|--------|-------|----------|--|-----------------------|
| | | 2.4GHz | 5 GHz | MIMO/MRC | | |
| WL1801MOD WL1801 | One | ✓ | | | | |
| WL1805MOD | Two | ✓ | | ✓ | | |
| WL1807MOD | Two | ✓ | ✓ | ✓ | | |
| WL1831MOD WL1831 | One | ✓ | | | ✓ | |
| WL1835MOD | Two | ✓ | | ✓ | ✓ | |
| WL1837MOD | Two | ✓ | ✓ | ✓ | ✓ | ✓ |

3 WiLink8 Evaluation Platforms for Development

There are multiple options to choose from while considering the developing/prototyping with WiLink8 devices. [Table 3-1](#) shows a list of hardware combinations available for development

Table 3-1. WiLink8 Evaluation Platforms for Development

| Module Part Number | WiLink8 Module Evaluation Board | Host Platform | Software Drivers |
|---|---|--|--|
| WL1837MOD , WL1807MOD | WiLink 8 Dual Band 2.4 & 5 GHz Wi-Fi + Bluetooth COM8 Evaluation Module | AM335x Evaluation Module | WiLink8 Driver SW for Wi-Fi Drivers and TI Bluetooth 4.2 Stack Add-On for Linux Platforms With WL183x and CC2564C for Bluetooth and Bluetooth low energy |
| WL1835MOD , WL1805MOD , WL1831MOD , WL1801MOD | WiLink 8 Module 2.4 GHz WiFi + Bluetooth COM8 Evaluation Module | AM335x Evaluation Module | |
| WL1837MOD , WL1807MOD | Element 14 - Wireless Connectivity Cape for BeagleBone Black | BeagleBone Black | |

[WL18XXCOM82SDMMC](#) - The WiLink™ SDIO board is a SDMMC adapter board and is an easy to use connector between a WiLink COM8 Evaluation module [[WL1837MODCOM8i](#) and [WL1835MODCOM8B](#)] and a generic SD/MMC card slot on a host processor EVM. [WL18xxCOM82SDMMC WL18XX SDMMC and UART Adapter Board User's Guide](#) provides more details of the wiring needed for host processor connection. Additional wiring example for AM65x platform is provided in [Integrating a WiLink8 Module with the AM65x EVM](#).

In addition, the adapter is a standalone evaluation platform using TI wireless PC debug tools for any WiLink module/chip solution with a PCB 100-pin edge connector. The required tools are mentioned in the next section.

4 WiLink8 Host Linux OS Software Information

Royalty free Linux OS open source drivers are provided along with WiLink8 for both WLAN and Bluetooth/Bluetooth low energy (Linux BlueZ) functionality. Additionally, the Bluetopia™ stack is offered from TI for Bluetooth/Bluetooth low energy. The driver package is verified and tested with Sitara™ AM335x EVM along with WL1837MODCOM81 module evaluation board. The software is compatible with entire WiLink8 family of devices.

- [WiLink8 Wi-Fi Driver for Linux OS](#) provides complete details of the driver package for Wi-Fi. [WiLink8 Linux Wi-Fi Driver Release R8.8 Build User's Guide](#) provides the details of platform integration of the driver components to host Linux OS.
- [TI Bluetooth 4.2 Stack Add-On for Linux Platforms With WL183x and CC2564C](#) provides TI Bluetooth Stack add-on package for BT

Note

- [Processor SDK for AM335x Sitara Processors - Linux and TI-RTOS support](#) contains the processor SDK for Sitara™ processors with pre integrated Wi-Fi components. However, it is recommended that you refer to the latest [WiLink R8.8 Release notes](#) and use that drivers in integration.
 - The latest Bluetooth service pack is located at [Bluetooth service pack for WL18xx..](#) The TI Bluetopia Stack integration details are provided at [TI Bluetooth Stack for WL18xx - Getting Started Guide](#).
-

5 WiLink8 Hardware Design Documentation

In order to speed up hardware integration and avoid any potential errors, it is highly recommended to refer to [WiLink™ Module Hardware Integration Guide Use's Guide](#). This user's guide provides the details of the power supply, clocks, antenna, ground connections and hardware trouble shooting guidelines. Designers can also request a review of their layout and schematic by using [Hardware design reviews for WL18xx devices](#) link.

Detailed data sheets, design guides and other collaterals for WiLink8 chip is provided through the secure link available from product pages.

Note

Additionally, [Level Shifting WL18xx/WL18xxMOD/WL18xxQ I/Os](#) provides the details of the IO level shifting that may be needed for host processors that are not 1.8 V I/O compatible. Certain features like WoW supports needs additional general-purpose input/output (GPIO) interfaced to the host. The details from a HW integration perspective are presented in [WL18xx Adding WoWLAN](#) wiki page.

6 Radio Certification for WiLink 8

WiLink8 modules related certifications can be found in the following links. This includes the certification reports, Certification transfer form, certification support request for the standards that are not covered, and so forth.

- [WL18XX-CERTIFICATION](#) – Main landing page for WiLink8 Certifications that are completed and available.
- [WL18XX Regulatory Certification Reports](#) – Contains the repository for all the certification reports for all EVM and modules that are tested for different standards (FCC, CE, ISED, Japan, Mexico, Brazil, and Argentina, and so forth).
- [Certification transfer request form](#) - May be used to request a FCC/Canada Change in ID. The customers who need to add additional tests (such as SAR testing) stay comply with original filing rules of the module.
- [Certification support for regions not currently supported by the WiLink 8 modular certification](#) – Needed by the customers who need additional information to get the certification process completed for regions where WiLink8 modules are not already certified.

“WiLink Certification Reports 4.10.00.00 Release Notes” contains the details of each of the certified hardware and available certification and the expiration date.

For Bluetooth SIG certification, BT5.1 certification the DIDs are listed in the [Table 6-1](#).

Table 6-1. Bluetooth and Bluetooth low energy Certification Information

| Declaration ID | QDID | Modules Applicable | Product Type | Specification Name | Listing Date |
|-------------------------|------------------------|--|----------------------|--------------------|--------------|
| D052427 | 156961 | WL1837MOD | Controller Subsystem | 5.1 | 2020-10-13 |
| D052428 | 156966 | WL1831MOD WL1835MOD | Controller Subsystem | 5.1 | 2020-10-13 |
| D057247 | 177062 | WL1831 | Controller Subsystem | 5.1 | 2021-10-12 |
| D055685 | 172097 | TI BT 5.1 Host Subsystem (based on Bluetopia) | Host Subsystem | 5.1 | 2021-07-16 |
| D055684 | 172096 | TI Bluetooth Profile Subsystem (based on Bluetopia) | Profile Subsystem | 5.1 | 2021-07-16 |

7 Supported Tools for WiLink8 Evaluation Without Host Processor

The [WiLink™ Wireless Tools](#) package contains several tools for both Bluetooth and WLAN evaluation using PC environment. The package contains the following tools.

Table 7-1. WiLink Wireless Tools Package Contents

| Technology | Tool Name | Utility | |
|--------------------------------|-----------------------------------|--|--|
| WLAN | WLAN Real-Time Tuning Tool (RTTT) | RF system debug and calibration software tool | |
| | WLAN gLogger | Records messages from the WiLink WLAN firmware. More details can be found at WiLink™ WLAN gLogger Tool | |
| Bluetooth/Bluetooth low energy | HCITester Tool | enables HCI testing capabilities for TI Bluetooth devices | |
| | | BTSout | Sends the BTS to the device on a specified port and baud rate |
| | | BTSTransform | Converts the BTS format to Hex command strings |
| | | ScriptPad | Allows the text file to be saved in BTS format in the HCI tester |
| | | Bluetooth Logger | Traces log messages generated by the Bluetooth host controller and monitors protocol transactions. More details on the usage of the tool is provided at Bluetooth® Logger and Link Quality Monitor (LQM) Tools |
| | | Link Quality Monitor (LQM) | Monitors system behavior using the received signal strength indication (RSSI), link throughput, and adaptive frequency hopping (AFH) map table of all active Bluetooth and Bluetooth low-energy links in run time |

[TI Wireless Tools Package Getting Started Guide](#) provides the details of installation, functionality and operation of each of the tools contained in the Wireless Tools package.

8 References

The below section provides list of additional documentation available for WiLink8.

8.1 Application Reports

- Texas Instruments: [WL18xx 5GHZ Antenna Diversity](#)
- Texas Instruments: [Precise Time Synchronization Over WLAN](#)
- Texas Instruments: [WiLink 8.0TM WLAN IP Mesh](#)
- Texas Instruments: [FIPS Compliant vs. FIPS Validated](#)
- Texas Instruments: [WL18xx .INI File](#)
- Texas Instruments: [WiLink 8 Solutions WiLink8 - wlconf Manual](#)
- Texas Instruments: [Level Shifting WL18xx/WL18xxMOD/WL18xxQ I/Os](#)
- Texas Instruments: [CE Regulations for SRDs Operating in License-Free 2.4GHz/5GHz Bands-WiFi Devices](#)
- Texas Instruments: [Enhanced HCILL: Four-Wire Power Management Protocol](#)
- Texas Instruments: [Certification Testing Guidelines for Wi-Fi Alliance® System Interoperability Test Plans](#)
- Texas Instruments: [Certification Testing Guidelines for WFA System Interoperability Test Plans – MCP](#)
- Texas Instruments: [Certification Testing Guidelines for WFA System Interoperability Test Plans – NLCP](#)
- Texas Instruments: [Secure Connection Capability for WiLink Bluetooth 4.2](#)
- Texas Instruments: [Bluetooth Low Energy, Basic Rate/Enhanced Data Rate – Method Confusion Pairing Vulnerability](#)
- Texas Instruments: [Bluetooth Basic Rate/Enhanced Data Rate – Bluetooth Impersonation AttackS \(BIAS\)](#)
- Texas Instruments: [Capturing Bluetooth Host Controller Interface \(HCI\) Logs](#)

8.2 User's Guides

- [TI Bluetooth Stack for WL18xx - Demo Guide](#) wiki
- Texas Instruments: [WL1835MODCOM8 WLAN MIMO/BT Module Board](#)
- Texas Instruments: [WL1837MODCOM8I WLAN MIMO and Bluetooth® Module Evaluation Board for TI Sitara™ Platform](#)
- Texas Instruments: [WiLink™ 8 WLAN Features User's Guide](#)
- Texas Instruments: [WiLink WLAN gLogger Tool](#)
- Texas Instruments: [WiLink™ 8.0 Bluetooth® Vendor-Specific HCI Commands](#)
- Texas Instruments: [Bluetooth Logger and Link Quality Monitor \(LQM\) Tools](#)

8.3 Technical White Papers

- Texas Instruments: [Wi-Fi® audio: capabilities and challenges](#)
- Texas Instruments: [Wi-Fi® mesh networks: Discover new wireless paths](#)

8.4 Video Links

- [WPA-3 Security Video Tutorial](#)
- [WiLink 8 Wi-Fi + Bluetooth Getting Started Video Tutorial](#)

9 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| Changes from Revision A (May 2021) to Revision B (December 2021) | Page |
|--|------|
| • Updated the numbering format for tables, figures and cross-references throughout the document..... | 2 |
| • Updates were made in Section 6 | 4 |

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