RS9116 Connectivity Product Family

n-Link™ and WiSeConnect™

Product Brief

Silicon Labs' RS9116 family of SoCs and modules provides a comprehensive multi-protocol wireless connectivity solution including 802.11 a/b/g/n (2.4 GHz and 5 GHz) and dual-mode Bluetooth® 5.

Solution Highlights

- Co-existence of multiple wireless protocols managed by an internal protocol arbitration manager
- Ultra-low power consumption with multiple power modes to reduce the system energy consumption
- Multiple levels of security including WPA/WPA2 Personal, WPA2 Enterprise, SSL/TSL, to create a highly secure system
- Fully integrated and wireless certified modules with multiple sizes as small as 4.63 mm x 7.90 mm
- Multiple software architectures (hosted and embedded) and host interfaces (SDIO, USB, SPI, UART) for easy integration with different processor families and operating systems, including Linux and MCUs
- Leading edge RF performance providing long range and higher throughputs

Features

Wi-Fi®

- Compliant to single-spatial stream IEEE 802.11 a/b/g/n with single band (2.4 GHz), and dual band (2.4 and 5 GHz) support
- Support for 20 MHz channel bandwidth
- Transmit power up to +20 dBm with integrated PA
- Receive sensitivity as low as -97 dBm

Bluetooth

- Compliant to dual-mode Bluetooth 5
- <8 mA transmit current in Bluetooth 5 mode, 2 Mbps data rate
- Data rates: 125 Kbps, 500 Kbps, 1 Mbps, 2 Mbps, 3 Mbps
- Operating Frequency Range:- 2.402 GHz - 2.480 GHz
- Bluetooth 2.1 + EDR, Bluetooth Low Energy 4.0 / 4.1 / 4.2 / 5.0
- Bluetooth Low Energy 1 Mbps, 2 Mbps and Long Range modes
- Bluetooth Low Energy Secure connections
- Bluetooth Low Energy supports central role and peripheral role concurrently
- Bluetooth auto rate and auto TX power adaptation

RF Features

- Integrated baseband processor with calibration memory, RF transceiver, high-power amplifier, balun and T/R switch
- Integrated Antenna and u.FL connector
- Diversity is supported

Software Operating Modes

- Hosted mode (n-Link™): Wi-Fi stack, Bluetooth stack and profiles and all network stacks reside on the host processor
- Embedded mode (WiSeConnect™): Wi-Fi stack, TCP/IP stack, IP modules, Bluetooth stack and some profiles reside in RS9116; Some of the Bluetooth profiles reside in the host processor

Hosted Mode (n-Link™)

- Available host interfaces: SDIO 2.0 and USB HS
- Application data throughput up to 50 Mbps (Hosted Mode) in 802.11n with 20 MHz bandwidth
- Host drivers for Linux
- Support for Client mode, Access point mode (Upto 16 clients), Concurrent Client and Access Point mode, and Enterprise Security
- Support for concurrent Wi-Fi, dual-mode Bluetooth 5

Embedded Mode (WiSeConnect™)

- Available host interface: UART, SPI, SDIO*, and USB CDC
- TCP throughput > 20 Mbps over SDIO host interface with 20 MHz bandwidth
- Support for Embedded Client mode, Access Point mode (Up to 8 clients), Concurrent Client and Access Point mode, and Enterprise Security
- Supports advanced security features: WPA/WPA2-Personal and Enterprise
- Integrated TCP/IP stack, HTTP/HTTPS, SSL/TLS, MQTT
- Bluetooth profile support for GAP, SDP, SPP, GATT, L2CAP and RFCOMM
- Wireless firmware update and provisioning
- Support for concurrent Wi-Fi, dual-mode Bluetooth 5

Security

- Accelerators: AES128/256 in Embedded Mode
- WPA/WPA2-Personal, WPA/WPA2 Enterprise for Client

Power Consumption (2.4 GHz SoC/Module)

- Wi-Fi Standby Associated mode current: 50 uA @ 1 second beacon listen interval
- Wi-Fi 1 Mbps Listen current: 14 mA
- Wi-Fi LP chain Rx current: 19 mA
- Deep sleep current <1 uA, Standby current (RAM retention) < 10 uA

Software and Regulatory Certifications

- Wi-Fi Alliance*
- Bluetooth Qualification*
- Regulatory certifications (FCC, IC, ETSI/CE, TELEC)*

Operating Conditions

- Single supply: 2.1 to 3.6 V or 1.85 V
- Operating temperature: -40 °C to +85 °C (Industrial Grade)

Packages

- Module packages with and without antenna
- SoC packages: QFN

Evaluation Kit:

- Single band EVK with QMS SoC: RS9116X-SB-EVK1
- Single band EVK with B00 SiP Module: RS9116X-SB-EVK2
- Dual band EVK with CC1 Module: RS9116X-DB-EVK1

***** Contact Silicon Labs for details.

Package Options

Module Packages

Package Code	Package Type, Pins	Dimensions (mm)	Frequency Band	Integrated Antenna
CC0	LGA, 173	9.1 x 9.8 x 1.6	Dual Band (2.4 / 5 GHz)	No
CC1	LGA, 155	15.0 x 15.70 x 2.2	Dual Band (2.4 / 5 GHz)	Antenna and u.FL Connector
B00	LGA, 126	4.63 x 7.90 x 0.9	Single Band (2.4 GHz)	No

SoC Packages

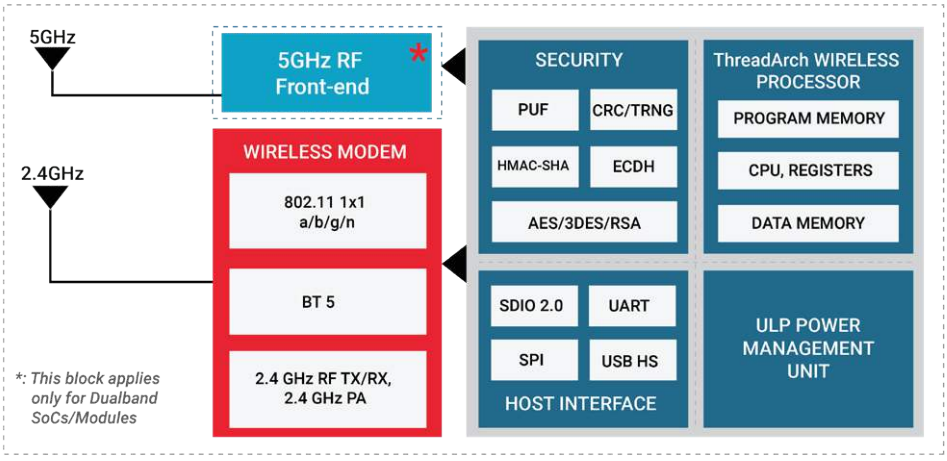
Package Code	Type of Package, Pins	Dimensions, Pitch (mm)	Frequency Band
QMS	QFN, 84	7 x 7 x 0.85, 0.5	Single Band (2.4 GHz)

Part Ordering Options

Part Number	Wireless	SoC Packages (ppg)	Module Packages (ppg)
Hosted Connectivity (n-Link™)			
RS9116N-SB00-ppg-abc	SBW+Bluetooth 5	QMS	B00
RS9116N-DB00-ppg-abc	DBW+Bluetooth 5	None	CC0, CC1
Embedded Connectivity (WiSeConnect™)			
RS9116W-SB00-ppg-abc	SBW+Bluetooth 5	QMS	B00
RS9116W-DB00-ppg-abc	DBW+Bluetooth 5	None	CC0, CC1

Note: *Replace 'ppg' with desired SoC/Module Packages code*
'abc': 'a' represents Silicon version, and 'bc' represents Firmware version
SBW*: Single Band Wi-Fi (2.4 GHz);* ***DBW****: Dual Band Wi-Fi (2.4/5 GHz)*

Block Diagram



Note: All the performance and power numbers are measured under ideal conditions. There may be variation in numbers based on the actual condition as well as across different modules and SoCs.

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