REDPINE SIGNALS®

DRIVING WIRELESS CONVERGENCE®

Redpine Signals' 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) 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
- Footprint compatible single band and dual band modules as well as hosted and embedded modules for easy migration within the product family
- 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 bandwidths
- Transmit power up to +20dBm* 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, 2Mbps, 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
- Scatternet* with two slave roles while still being visible.

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

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
- Support for 20 MHz and 40 MHz channel bandwidths
- 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, 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 > 20Mbps over SDIO host interface with 20 MHz bandwidth
- Support for Embedded Client mode, Access Point mode (Upto 8 clients), Concurrent Client and Access Point mode, and Enterprise Security
- Supports advanced security features: WPA/WPA2-Personal and Enterprise*
- Integrated TCP/IP stack (IPV4/IPV6), HTTP/HTTPS, DHCP, ICMP, SSL 3.0/TLS1.2, WebSockets, IGMP, DNS, DNS-SD, SNMP, FTP Client, MQTT*
- Bluetooth inbuilt stack support for L2CAP, RFCOMM, SDP, SPP, GAP
- Bluetooth profile support* for GAP, SDP, L2CAP, RFCOMM, SPP, GATT, PBAP
- Wireless firmware upgrade and provisioning
- Support for concurrent Wi-Fi, dual-mode Bluetooth 5

Security
- Accelerators: AES128/256 in Embeded Mode
- WPA/WPA2-Personal, WPA/WPA2 Enterprise for Client*
- Secure Firmware upgrade* with backup

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

Software and Regulatory Certifications

- Wi-Fi Alliance[2]
- Bluetooth Qualification[2]
- Regulatory certifications (FCC, IC, ETSI/CE, TELEC)[2]

Operating Conditions

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

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

Evaluation Kit:

- Single band P/N: RS9116X-SB-EVK1
- Dual band P/N: RS9116X-DB-EVK1

Package Options

Module Packages

| Package Code	Package Type	Dimensions (mm)	Frequency Band	Integrated Antenna	Note
AA0	LGA, 101	14 x 15 x 2.1	Single Band (2.4 GHz)	No	RS9113 compatible
AA1	LGA, 79	16 x 27 x 3.1	Single Band (2.4 GHz)	Antenna and u.FL Connector	RS9113 compatible
CC0	LGA, 173	9.1 x 9.8 x 1.2	Dual Band (2.4 / 5 GHz)	No	
CC1	LGA, 107	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	
MB0	M.2, 75	22 x 30	Dual Band (2.4 / 5 GHz)	Two u.FL Connectors	
HB0	Half Mini PCIe Card, 52	26.8 x 30	Dual Band (2.4 / 5 GHz)	Two u.FL Connectors	USB interface

SoC Packages

Package Code	Type of Package	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	SBW+Bluetooth 5	QMS	AA0, AA1, B00
RS9116N-DB00-ppg	DBW+Bluetooth 5	None	CC0, CC1, MB0, HB0
Embedded Connectivity (WiSeConnect™)			
RS9116W-SB00-ppg	SBW+Bluetooth 5	QMS	AA0, AA1, B00
RS9116W-DB00-ppg	DBW+Bluetooth 5	None	CC0, CC1

Note: *Replace 'ppg' with desired SoC / Module Packages code;*
SBW: *Single Band Wi-Fi (2.4 GHz);* **DBW**: *Dual Band Wi-Fi (2.4/5 GHz)*

Block diagram

*: This block applies only for Dualband SoCs/Modules
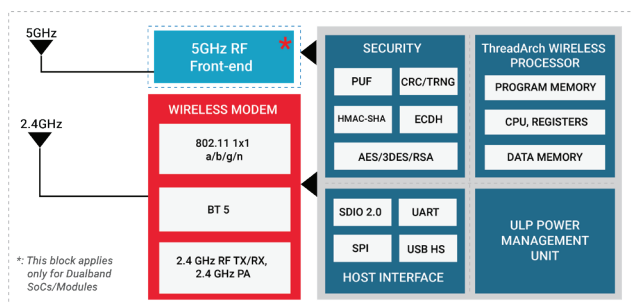
Note: *The BTSIG certified production parts for this product family will be available in early 2019.*

[1]: *Subject to change. Contact Redpine Signals for final numbers.*   [2]:*Contact Redpine for availability.*

Redpine Signals, Inc.
2107 North First Street, Suite #540, San Jose, California 95131, United States of America.
Phone: +1-408-748-3385 | Fax: +1-408-705-2019
Email: sales@redpinesignals.com | Website: www.redpinesignals.com

REDPINE SIGNALS ®
DRIVING WIRELESS CONVERGENCE ®

Mouser Electronics

Authorized Distributor

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Silicon Laboratories:

RS9116N-SB00-CA1-X00   RS9116W-DB00-CC1-X20   RS9116N-SB00-B00-X00   RS9116N-DB00-CC1-X00
RS9116W-DB00-CC0-X12   RS9116N-SB00-CA0-X00   RS9116W-DB00-AB1-X12   RS9116W-SB00-B00-X12
RS9116W-SB00-AA0-X20   RS9116W-DB00-AB0-X12   RS9116N-SB00-AA1-X00   RS9116W-SB00-CA0-X23
RS9116W-SB00-B00-X23   RS9116W-SB00-AA1-X23   RS9116W-SB00-CA1-X12   RS9116W-SB00-AA0-X23
RS9116W-DB00-CC0-X23   RS9116W-SB00-AA1-X12   RS9116W-SB00-CA1-X20   RS9116W-SB00-CA1-X23
RS9116W-DB00-AB0-X23   RS9116W-DB00-AB1-X20   RS9116W-DB00-CC0-X20   RS9116N-SB00-AA0-X00
RS9116W-SB00-AA1-X20   RS9116W-SB00-B00-X20   RS9116W-DB00-CC1-X21   RS9116W-SB00-CA0-X12
RS9116W-SB00-AA0-X12   RS9116N-DB00-CC0-X00   RS9116N-DB00-AB1-X00   RS9116W-DB00-CC1-X12
RS9116W-DB00-CC1-X23   RS9116W-SB00-CA0-X20   RS9116W-DB00-AB0-X20   RS9116N-DB00-HB0-X00
RS9116W-DB00-AB1-X23   RS9116N-DB00-AB0-X00   RS9116W-DB00-CC1-X11   RS9116N-DB00-MB0-X00