RS9113 WiSeConnect® Module Family

REDPINE SIGNALS®

Driving Wireless Convergence

**PRODUCT BRIEF**

1x1 802.11abgn + BT4.0 + ZigBee

The RS9113 WiSeConnect module is based on Redpine Signals RS9113 ultra-low-power, single spatial stream, dual-band 802.11n + Bluetooth (BT4.0) + ZigBee (ZB) Convergence SoC. The RS9113 module is a complete IEEE 802.11 a/b/g/n, ZB and BT wireless device server that provides a wireless interface to any equipment with a SDIO, UART, SPI or USB interface. The RS9113 module integrates a multi-threaded MAC processor with integrated analog peripherals and support for digital peripherals, baseband digital signal processor, analog front-end, crystal oscillator, calibration OTP memory, dual-band RF transceiver, dual-band high-power amplifiers, baluns, diplexers, diversity switch and Quad-SPI Flash thus providing a fully-integrated solution for embedded wireless applications and all WLAN, BT and ZB protocols and networking stack functionality in embedded firmware to make a fully self-contained wireless solution for a variety of applications. The module integrates an antenna and a U.FL connector for external antenna with an option to select either one of them. The M2MCombo (RS9113) chips and modules leverage and improve upon Redpine's proven low power innovations from Lite-Fi™ products (RS9110) and provide WLAN 802.11n, BT4.0 and ZB convergence solution for integration into mobile and M2M communication devices.

Features and Benefits

- RS9113 WiSeConnect module integrates WLAN, BT 4.0 and ZigBee functions.
- WLAN: Compliant to IEEE 802.11 a/b/g/n with dual band support.
- Bluetooth: Compliant to dual-mode Bluetooth V4.0
- ZigBee: Compliant to IEEE 802.15.4
- Supports both 20MHz and 40MHz bandwidth.
- WLAN transmit power up to +18dBm and receiver with sensitivity of -97dBm.
- Support for Bluetooth Transmit power class-1 with integrated PA and high performance Bluetooth receiver with -94dBm Rx sensitivity.
- Support for multiple ZigBee output powers up to +19dBm with integrated PA and high performance ZigBee receiver with -100dBm Rx sensitivity.
- U.FL connector for external antenna connection is selectable.
- Dual external antenna (diversity supported).
- Embedded WLAN stack, ZigBee stack, BT stack, TCP/IP stack, HTTP server.
- Support for Embedded Client mode and Access Point mode.
- BT profile support for GAP,SDN,PAN,SPP,IAP,HFP 1.5,GATT,ATTR,IAP,A2DP,ACRP.[†]
- Supports for ZigBee profiles like Home-automation and Smart Energy
- Supports SPI, UART, USB, SDIO host interfaces.
- Can operate with 8-bit microcontrollers with no OS.
- Single supply 3.0 to 3.6 V operation.
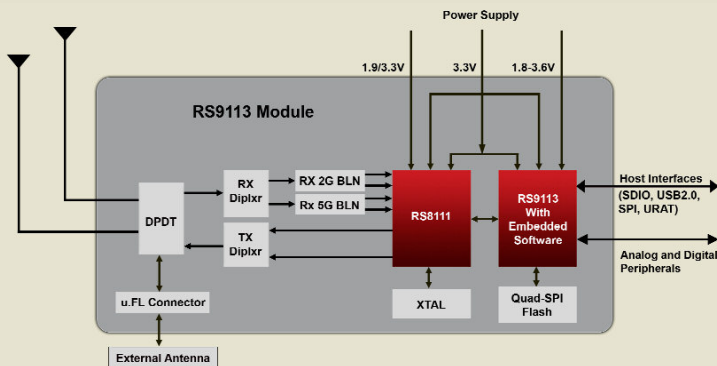

Module without integrated antenna
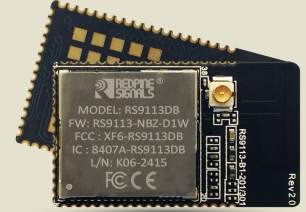
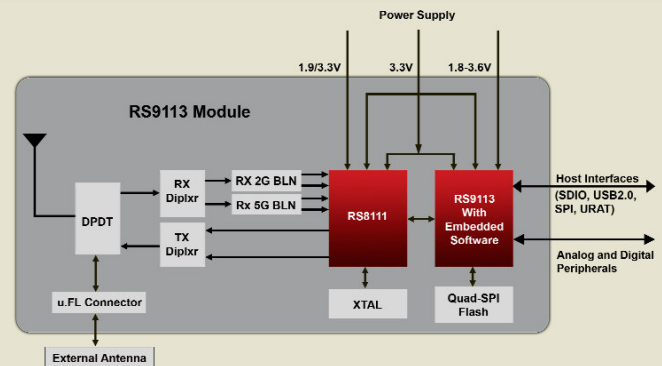Module with integrated antenna

Applications

- IoT Devices
- VoWi-Fi phones
- Smart Meters and in-home displays
- Industrial automation and telemetry
- Wi-Fi-BT gateway device
- Wireless headset
- Music and video players
- Medical Devices
- Industrial monitoring and control
- Home and building automation
- Wi-Fi-ZB gateway device

Evaluation Package

The evaluation package comprises RS9113 WiSeConnect module based evaluation board. This is accompanied by driver source code for host interface, firmware and documentation.

RS9113 Module Block Diagram without integrated antenna

RS9113 Module Block Diagram with integrated antenna

Wireless Specifications

Network Standard Support	IEEE 802.11 a/b/g/n, 802.11j[†], 802.11d/e/i, 802.11w[†], 802.1X, 802.11k[†], 802.11v[†], 802.11r[†], 802.11h[†] Bluetooth v2.1 EDR, v4.0 802.15.4-2009 (2.4GHz)
Data Rates	802.11n: from 6.5 Mbps to 150 Mbps (MCS 0-7) 802.11a/g: from 6 Mbps to 54 Mbps 802.11b: from 1 Mbps to 11 Mbps Bluetooth: 1, 2, 3Mbps 802.15.4-2009: 250Kbps
Modulation Techniques	OFDM with BPSK, QPSK, 16-QAM, 64-QAM 802.11b with CCK and DSSS Bluetooth: GFSK, DQPSK, 8DPSK 802.15.4-2009: DSSS
802.11n Advanced Features	1-SS, 40MHz bandwidth, Greenfield Preamble, Short-GI, 1 spatial stream STBC, RIFS, A-MSDU, A-MPDU, Aggregation with Block-ack, A-MSDU inside A-MPDU and Virtual AP support
Bluetooth Advanced Features[†]	Scatternet, Adaptive Frequency Hopping, Interlaced scanning, 15 active slaves in proprietary mode, hold, sniff and park modes
ZigBee Advanced Features	CCM* security, orphan scanning, coordinator realignment
Wi-Fi modes	Wi-Fi client, Access point, Wi-Fi Direct
Bluetooth Modes	Master, slave, scatternet[†]
ZigBee Modes	ZigBee Coordinator[†], Router[†], End device
QoS	WMM and WMM Power Save Support
Host Interfaces	USB 2.0, SPI, UART
Other Peripherals/Interfaces	I2C, I2S, SPI, QSPI, USART, GPIO, JTAG, Analog(ADC/DAC) and Ultra-low-power peripherals.
Supply Voltage	3.0-3.6V, 1.8-3.6V
Operating Temperature	Industrial Grade -40ºC to +85ºC
Software and Regulatory Certification	Wi-Fi Alliance Compliance (802.11bgn, WPA, WPA2 Personal and Enterprise, WMM, WMM-PS, WPS, Wi-Fi Direct™, Voice-Personal[β], Protected management frames[†]), Cisco CCX v5[†], Bluetooth-SIG Qualification[‡], Worldwide Regulatory Compliance: FCC (IDs are XF6-RS9113SB, XF6-RS9113DB) IC (IDs are 8407A-RS9113SB, 8407A-RS9113DB) CE/ETSI, TELEC[‡], SRRC[‡]

Typical Transmit Power(+/-2 dBm)	Wi-Fi:	17.5 dBm for 802.11b DSSS
		17.5 dBm for 802.11g/n OFDM
		12 dBm for 802.11a/g/n OFDM
	Bluetooth:	15 dBm
	ZigBee :	15 dBm

Rx sensitivity (+/- 1dBm)	Wi-Fi:	1Mbps	-97 dBm (< 8% PER)
		54 Mbps	-76.5 dBm (< 10% PER)
		MCS7(20MHz)	-73 dBm (< 10% PER)
		MCS7(40MHz)	-69.5 dBm (< 10% PER)
	Bluetooth:	1 Mbps	-94 dBm
		2 Mbps	-92 dBm
		3 Mbps	-84 dBm
		BTLE(1Mbps)	-91 dBm
	ZigBee:	250 Kbps	-102 dBm (< 8% PER)

†: These features may not be supported by current software releases. Contact Repine Signals Sales (sales@redpinesignals.com) for details.

‡: These certifications are in progress at this time. Contact Redpine Signals Sales (sales@redpinesignals.com) for more details and for certifications not listed here.

β: Applicable to n-Link® modules only

Device Ordering Information

The device numbering is based on the following naming convention. All the devices are labeled as RS9113-XYZ-ABC Where,

`RS9113` - `N` `Y` `Z` - `A` `B` `C`

`A` ="S" for single band (2.4 GHz), "D" for dual band (2.4 GHz/5GHz)
`B` ="O" for no antenna package, "1" for single antenna package
`C` ="N" for n-Link product family,
="C" for Connect-io-n product family,
="W" for WiSeConnect product family

`N` = Wi-Fi
`Y` ="B" with BT, "O" without BT
`Z` ="Z" with ZigBee, "O" without ZigBee

Examples:

- RS9113-NBZ-S0N will refer to single band n-Link module with no antenna and integrated Wi-Fi, Bluetooth and Zigbee.
- RS9113-N00-D1C will refer to a dual band Connect-io-n module with embedded single antenna and integrated Wi-Fi.
- RS9113-NB0-S0W will refer to a single band WiSeConnect module with no antenna and integrated Wi-Fi and Bluetooth.

Module Reference Design

Redpine offers form-factor SPI, USB2.0, UART and SDIO reference designs along with software for manufacture testing and diagnostics. For details on availability please contact sales

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For additional information, please contact Sales at Redpine Signals, Inc.:

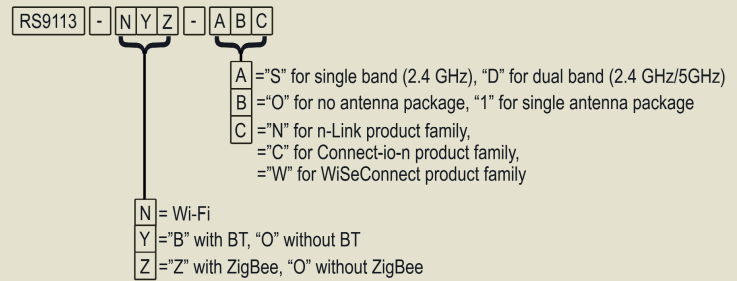Redpine Signals, Inc. • 2107 North First Street • Suite 540 • San Jose, CA 95131

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