RS9113 WiSeConnect® Module Family

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 perform ance 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
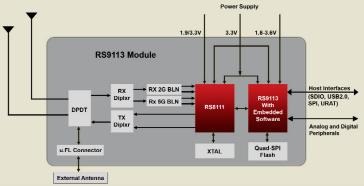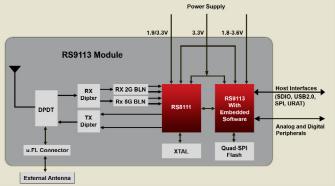- Wi-Fi-BT gateway device
- Wireless headset
- Music and video players
- Medical Devices
- Industrial monitoring and control
- Home and building automation
- Wi-Fi-ZB gateway device

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.

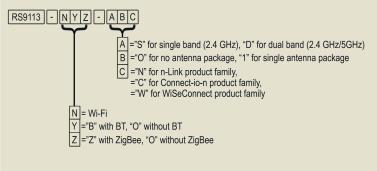**RS9113 Module Block Diagram without integrated antenna**

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-Personalβ, 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)

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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† : 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

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