

# RS9113 n-Link® Module Family



## PRODUCT BRIEF

RS9113

### 1x1 802.11abgn + BT4.0 + ZigBee

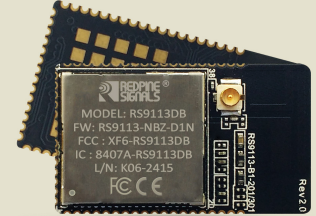
The RS9113 n-Link® module family is based on Redpine Signals RS9113 ultra-low-power, single spatial stream, dual-band 802.11n + BT4.0 + ZigBee Convergence SoC. The RS9113 module integrates a multi-threaded MAC processor with integrated analog peripherals and support for digital peripherals, baseband digital signal processor, analog front-end, crystal oscillator, calibration OTP memory, dualband 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. The RS9113 based 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 ZigBee convergence solution for integration into mobile and M2M communication devices. It can connect to a host processor through SDIO, USB, SPI or UART interfaces.

### Features and Benefits

- Ultra-low-power, low-cost and high-throughput 1 Tx – 1 Rx Dual-band 802.11n + BT4.0 (dual-mode) + Zigbee (802.15.4-2009)
- Supports 20MHz and 40MHz bandwidth
- Data rates up to 150 Mbps using 1-Spatial Stream 802.11n
- WLAN Tx output power up to +18dBm
- WLAN Receiver with -97dBm Rx sensitivity
- High performance Bluetooth receiver with -94dBm Rx sensitivity
- Support for Bluetooth Transmit power class-1 with integrated PA
- High performance ZigBee receiver with -100dBm Rx sensitivity
- Support for multiple ZigBee output powers up to +19dBm with integrated PA
- Innovative coexistence algorithms for optimum throughput of Wi-Fi and collocated Bluetooth and ZigBee modems
- Integrated Ultra-low-power subsystem with <3uA watch-dog mode and <30uA standby mode.
- Hardware Assisted Radar-detection for compliance to FCC and ETSI norms, enabling usage of more channels in the 5GHz band.
- Complete software along with host driver for various operating systems such as Windows, Linux, Windows CE, and Android.
- Single supply 3.0 to 3.6 V operation.
- Support for multiple host interfaces to allow maximum flexibility for the system integrator. Host interfaces supported are USB 2.0, SDIO, SPI and UART



Module without integrated antenna



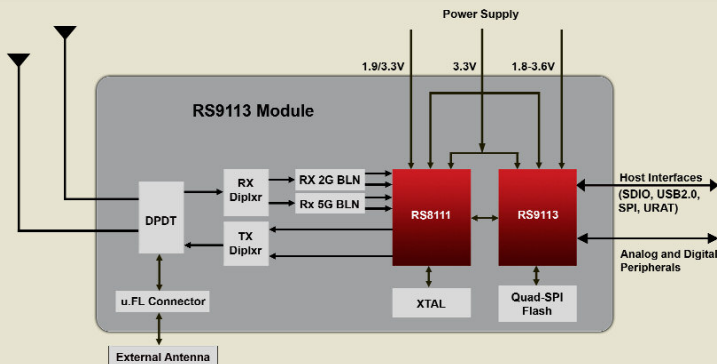
Module with integrated antenna

### Applications

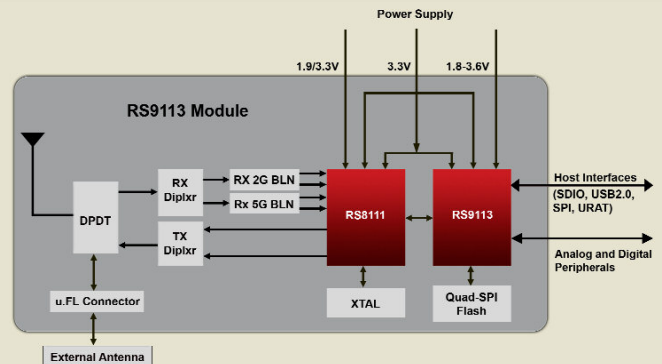
- IoT Devices
- VoWi-Fi phones
- Smart Meters and in-home displays
- Industrial automation and telemetry
- Music and video players
- Medical Devices
- Industrial monitoring and control
- Home and building automation

### Evaluation Package

The evaluation package comprises RS9113 n-Link module based evaluation board. This is accompanied by firmware, reference drivers for Linux, Windows and Android operating systems with 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 -40°C to +85°C
Software and Regulatory Certification	Wi-Fi Alliance Compliance (802.11bgn, WPA, WPA2 Personal and Enterprise, WMM, WMM-PS, WPS, Wi-Fi Direct™, Voice-Personal <sup>β</sup> , 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 are not supported by current software releases. Contact Redpine 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

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

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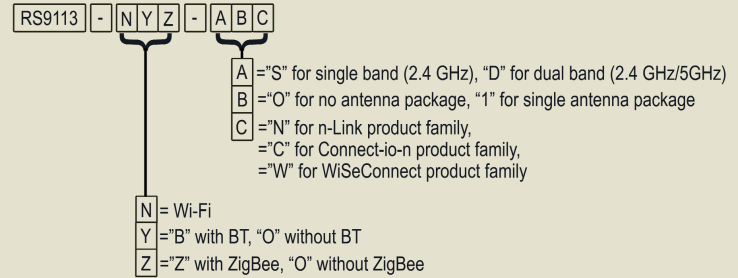
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## Device Ordering Information

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



## 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-i-o-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