RS9113 USB Half Mini Card: A Multi Protocol Wireless Mini PCI Express (PCIe) Card

**REDPINE SIGNALS**®
Driving Wireless Convergence

PRODUCT BRIEF

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The RS9113 USB Half Mini Card is based on Redpine Signals' RS9113 ultra-low-power Convergence SoC. It offers dual-band 1x1 802.11n, dual-mode Bluetooth 4.0 and ZigBee 802.15.4 in a single device over USB in a Mini PCIe Card form factor.

The RS9113 USB Half Mini Card is a high performance, long range and ultra-low power device and includes a multi-threaded MAC processor called ThreadArch®, baseband digital signal processor, calibration OTP memory, dual-band RF transceiver, dual-band high-power amplifiers, baluns, diplexers, diversity switch, dual-band antenna, u.FL connector and Quad-SPI flash.
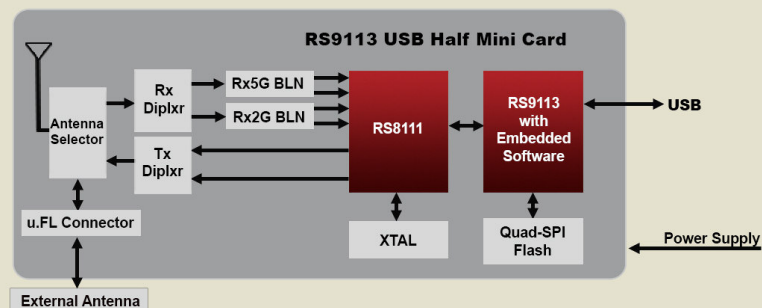
The software architecture for the USB Half Mini Card, n-Link®, realizes a host-based architecture where the necessary MAC and PHY layers are implemented in the device to support high-performance, long range WLAN, Bluetooth and ZigBee applications in a 32-bit host processor over USB interface.
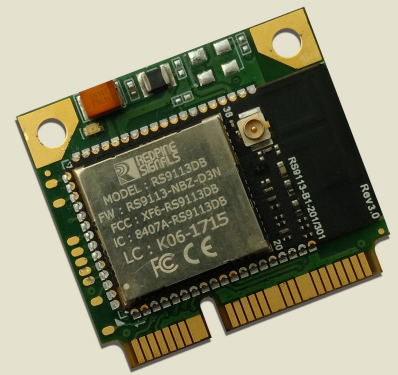
Multi-protocol Wireless Features:

- WLAN Compliant with IEEE 802.11 a/b/g/n with dual band support.
- WLAN transmit power up to +18dBm and receiver with sensitivity of -97dBm.
- Wi-Fi Direct, Enterprise Security, Client and Access Point modes of operation.
- Bluetooth Compliant with dual-mode Bluetooth v4.0
- Bluetooth transmit power up to 15dBm (class-1) with integrated PA
- Bluetooth receiver with -94dBm sensitivity.
- ZigBee Compliant with IEEE 802.15.4
- ZigBee output powers up to +15dBm with integratedPA and high performance ZigBee receiver with -102dBm sensitivity.
- Embedded ZigBee Pro stack.
- Supports advanced security features: WPA/WPA2-Personal and Enterprise(EAP-TLS, EAP-FAST, EAP-TTLS, EAP-PEAP)
- Seamless integration with 32-bit processors over USB.

System Block Diagram:

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
Supply Voltage	3.0-3.6V
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, 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: 18 dBm for 802.11b DSSS
	           18 dBm for 802.11g/n OFDM
	           12 dBm for 802.11a/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)

Applications:

- IoT gateway
- IoT node
- Industrial monitoring and control
- Industrial/Home gateway
- Medical devices

Device Ordering Information

The device numbering is based on the following naming convention. All the devices are labeled as RS9113-NBZ-D3N

| RS9113 | - | N | B | Z | - | D | 3 | N |

Base Module

Family

N	= Wi-Fi
B	= Bluetooth
Z	= ZigBee
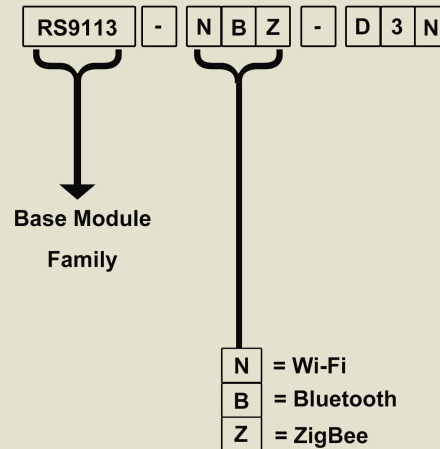
Package Description:

Half Mini Card Dimensions	LxWxH (mm)
	30 x 26.8 x 5.35

†: These features are not 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.

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