

N532ES-B Datasheet

High-Power 868/915 MHz Wireless Module with CC1314R10 MCU, +31 dBm Output, AT Commands and Optional TCXO

1. Product Overview

The **N532ES-B** is a low-cost, high-performance 868/915 MHz wireless module based on Texas Instruments’ **CC1314R10** wireless MCU and a Skyworks front-end module (FEM). It delivers up to **+31 dBm** output power with >52% PA efficiency, achieving an **8 km line-of-sight range** at 50 kbps (3 dBi antenna). The module provides three programmable power levels: **+27 dBm at 3.0 V**, **+30 dBm at 4.2 V**, and **+31 dBm at 4.8 V**. With an outstanding **-124 dBm** receiver sensitivity, the N532ES-B realizes a **155 dB link budget** – sufficient to penetrate walls, foliage, and industrial obstacles.

The device can be controlled via simple **UART AT commands**, eliminating the need for complex RF matching, firmware stacks, or lengthy certification debugging. It also exposes all **29 DIO pins**, JTAG, and reset, allowing full custom firmware development using TI Code Composer Studio or IAR. An **optional TCXO** (±2 ppm) is available for applications requiring extreme frequency stability over temperature.

The N532ES-B is **pin-to-pin compatible** with the N532AS-B (CC1310-based) and uses the same 30×21×3 mm SMD footprint, making it an easy upgrade path for existing designs.

Ideal for battery-powered long-range IoT applications including smart agriculture, utility metering, industrial control, and smart city infrastructure.

2. Key Features

Feature	Description
High Output Power	+27 dBm @ 3V, +30 dBm @ 4.2V, +31 dBm @ 4.8V (Skyworks FEM)
Exceptional Range	8 km line-of-sight @ 50 kbps (3 dBi antenna)
Sensitivity	-124 dBm @ 0.3 kbps / -112 dBm @ 50 kbps
Link Budget	155 dB
MCU	CC1314R10 – ARM Cortex-M4F, 352 KB Flash, 80 KB RAM

Feature	Description
Frequency Bands	868 MHz / 915 MHz (software selectable)
Data Rate	0.3 – 4000 kbps (2-FSK, 4-FSK, GFSK, MSK)
AT Command Interface	Pre-flashed firmware – control via UART, no coding required
Custom Firmware	Full I/O access (29 DIO, JTAG, RESET) – develop with TI SDK
Low Power Consumption	RX 12 mA, Sleep <1 μ A, TX 370-530 mA (peak)
Crystal Options	Standard XTAL (± 10 ppm) or TCXO (± 2 ppm, optional)
Supply Voltage	MCU: 2.3 – 3.6 V; PA: 2.3 – 5.5 V (separate supply)
Industrial Grade	-30°C to +75°C
Package	SMD, 30 × 21 × 3 mm, IPEX + stamp hole antenna
Compatibility	Pin-to-pin compatible with N532AS-B (CC1310 version)

3. Technical Specifications

3.1 Absolute Maximum Ratings

Parameter	Min	Max	Unit
VDD (MCU supply)	-0.3	3.9	V
VCC_PA (PA supply)	-0.3	5.5	V
Voltage on any DIO pin	-0.3	VDD + 0.3	V
Storage temperature	-40	+85	°C

3.2 Recommended Operating Conditions

Parameter	Min	Typ	Max	Unit
VDD (CC1314R10)	2.3	3.3	3.6	V
VCC_PA (PA supply)	2.5	3.3 / 4.2 / 4.8	5.5	V
Operating temperature	-30	+25	+75	°C

3.3 RF Performance

Parameter	Value	Condition
Frequency range	860 – 930 MHz	868/915 MHz bands
Output power (VCC_PA = 3.0 V)	+27 dBm	Typical
Output power (VCC_PA = 4.2 V)	+30 dBm	Typical
Output power (VCC_PA = 4.8 V)	+31 dBm	Typical
PA efficiency	>52%	@ +31 dBm, 915 MHz
RX sensitivity (50 kbps)	-112 dBm	Typical
RX sensitivity (1.2 kbps)	-124 dBm	Typical
Maximum range (LOS, 50 kbps)	8 km	3 dBi antenna, clear sky
Link budget	155 dB	+31 dBm / -124 dBm

3.4 Current Consumption

Mode	Current	Condition
TX @ +27 dBm	370 mA	VCC_PA = 3.3V
TX @ +30 dBm	480 mA	VCC_PA = 4.2V
TX @ +31 dBm	530 mA	VCC_PA = 4.8V

Mode	Current	Condition
RX	12 mA	Typical
Sleep	<1 μ A	Deep sleep, no retention

3.5 Crystal Specifications

Parameter	XTAL Version	TCXO Version (optional)
Frequency stability @ 25°C	± 10 ppm	± 2 ppm
Frequency stability over temp	± 20 ppm (-30~+75°C)	± 2 ppm (-30~+75°C)
Initial tolerance	± 10 ppm	± 1 ppm

4. Pinout (Pin-to-Pin Compatible with N532AS-B)

The N532ES-B uses **39 pins** in an SMD footprint. All DIO pins are directly connected to the CC1314R10.

Pin	Name	Function	Pin	Name	Function
1	RF	RF I/O	21	DIO15	Digital I/O
2	GND	Ground	22	TMS	JTAG
3	GND	Ground	23	TCK	JTAG
4	DIO1	Digital I/O	24	RESET	Reset
5	DIO2	Digital I/O	25	DIO16	Digital I/O
6	DIO3	Digital I/O	26	DIO17	Digital I/O
7	DIO4	Digital I/O	27	DIO20	Digital I/O
8	DIO5	Digital I/O	28	DIO21	Digital I/O
9	DIO6	Digital I/O	29	DIO22	Digital I/O

Pin	Name	Function	Pin	Name	Function
10	DIO7	Digital I/O	30	DIO23	Digital I/O
11	DIO8	Digital I/O	31	DIO24	Digital I/O
12	DIO9	Digital I/O	32	DIO25	Digital I/O
13	DIO10	Digital I/O	33	DIO26	Digital I/O
14	VCC_PA	PA supply (2.5–5.5V)	34	DIO27	Digital I/O
15	VDD	MCU supply (2.3–3.6V)	35	DIO28	Digital I/O
16	GND	Ground	36	DIO29	Digital I/O
17	DIO11	Digital I/O	37	DIO30	Digital I/O
18	DIO12	Digital I/O	38	VTCXO	Power of TCXO
19	DIO13	Digital I/O	39	GND	Ground
20	DIO14	Digital I/O	–	–	–

Note: For TCXO version, an additional supply pin (VTCXO) is present – contact Coral RF for pinout details. Standard XTAL version uses integrated crystal.

5. Development & Programming

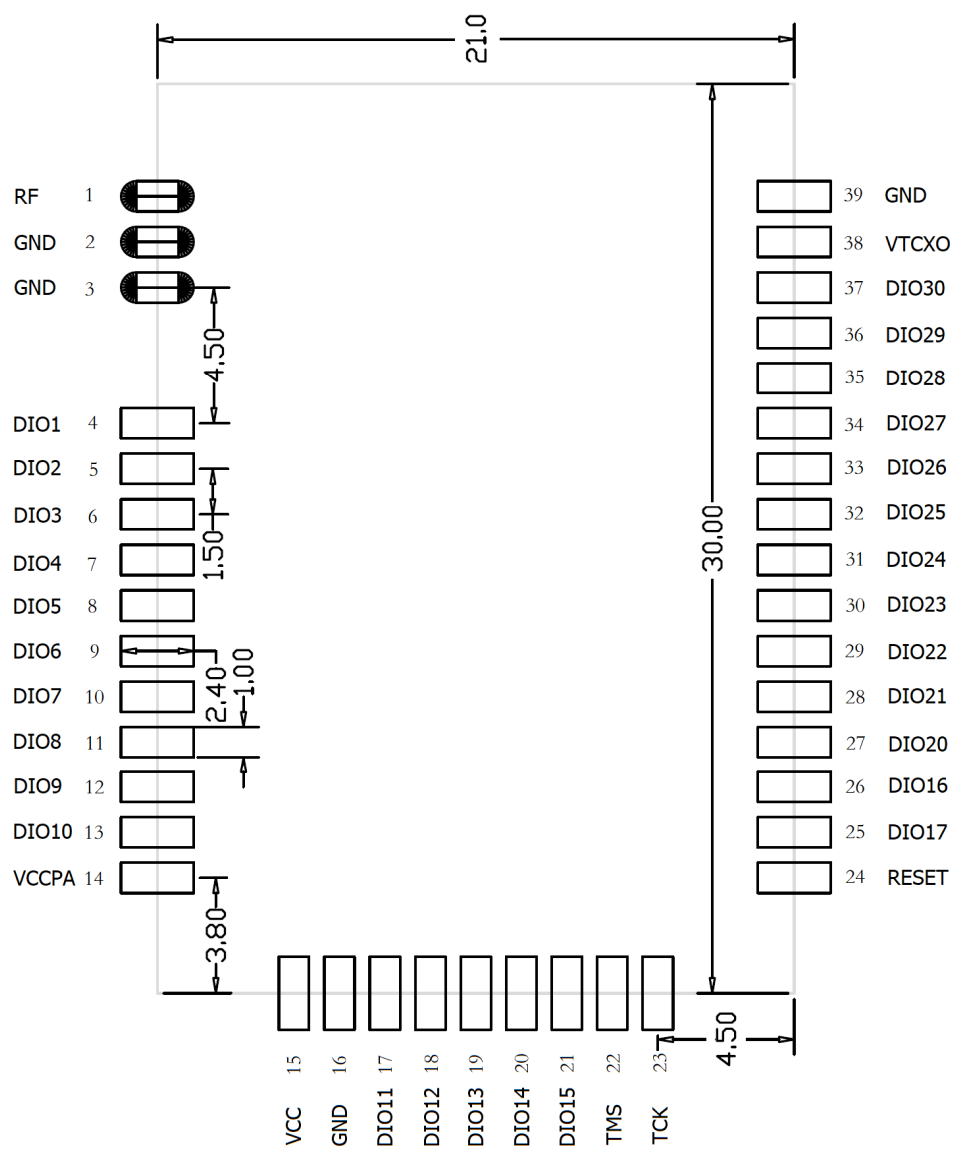
Custom Firmware Development

All 29 DIO pins, JTAG, and reset are accessible. The module is fully compatible with:

- TI Code Composer Studio / IAR Embedded Workbench
- TI CC13x2 SDK (TI 15.4-Stack, Wireless M-Bus, 6LoWPAN, proprietary)
- SmartRF Studio 7

6. Mechanical Drawing

Parameter	Value
Module size	30.0 × 21.0 × 3.0 mm
Weight	≈ 3.5 g
PCB	4-layer, 50Ω impedance controlled
Antenna interface	IPEX connector + stamp hole
Mounting	SMD, reflow compatible



7. Application Areas

- Long-range IoT sensors (agriculture, environment monitoring)
 - Smart metering (AMR/AMI for water, gas, electricity)
 - Industrial control and SCADA
 - Smart city (street lighting, waste management, parking)
 - Medical telemetry and patient monitoring
 - Wireless alarm and security systems
 - Home and building automation
 - Wireless M-Bus
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8. Ordering Information

Ordering Code	Frequency	Output Power	Crystal	Description
N532ES-B-868M-XTAL	860–880 MHz	+31 dBm	Standard XTAL	EU band, AT commands, CC1314R10
N532ES-B-868M-TCXO	860–880 MHz	+31 dBm	TCXO (± 2 ppm)	EU band, high stability
N532ES-B-915M-XTAL	902–928 MHz	+31 dBm	Standard XTAL	North America band
N532ES-B-915M-TCXO	902–928 MHz	+31 dBm	TCXO (± 2 ppm)	North America, high stability

All variants are **pin-to-pin compatible** with N532AS-B. Custom frequency and pre-programmed firmware available on request.

9. Compliance

- **EU:** EN 300 220, EN 301 489
- **US:** FCC Part 15 (modular approval pending – pre-scanned)
- **Australia:** AS/NZS 4268 (888 MHz variant available)
- **RoHS / REACH:** Compliant

Pre-certified modules available for qualified projects. Contact Coral RF for certification support.

10. Contact & Support

Request Samples: sales@coralrf.com

🔧 Technical Support: support@coralrf.com

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Specifications subject to change without notice. For latest revision, refer to official website.