

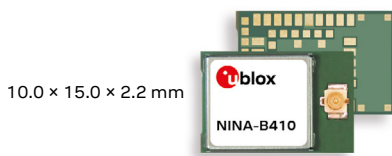
NINA-B41 series



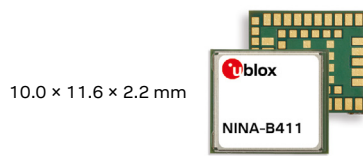
Stand-alone Bluetooth 5.1 Low Energy modules

Bluetooth 5.1 module for harsh professional environments

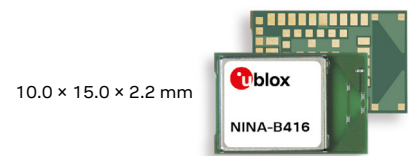
- Bluetooth 5.1 module with long range and direction finding support
- u-connect software for accelerated time to market
- Extended temperature range to 105 °C
- Superior security functionality
- Pin compatible with other NINA modules
- Global certification



10.0 × 15.0 × 2.2 mm



10.0 × 11.6 × 2.2 mm



10.0 × 15.0 × 2.2 mm

Product description

The NINA-B41 series is comprised of small, stand-alone Bluetooth Low Energy modules featuring full Bluetooth 5.1. The modules are delivered with u-connectXpress software that provides support for u-blox Bluetooth Low Energy Serial Port Service, GATT client and server, beacons, NFC™, and simultaneous peripheral and central roles. u-blox u-connectXpress software allows hosts to easily configure connectivity using AT commands over a UART interface.

NINA-B41 modules provide top grade security, thanks to secure boot, which ensures that the modules only boot up with authenticated u-connectXpress software. Leveraging Bluetooth 5 long range feature support, NINA-B41 modules also offer an extended communication range with reliable connections. NINA-B41 caters towards applications in smart buildings, smart cities, industrial automation systems, sensor networks, and asset tracking solutions.

For location applications, NINA-B41 supports Bluetooth 5.1 direction finding via angle-of-arrival. Connected to an array of antennas, the module can determine the direction from which a signal is transmitted, which allows for more accurate location methods. The algorithms required to calculate the angle-of-arrival are embedded in the u-connectLocate software that runs in the module MCU.

The NINA-B41 series is globally certified for use with the internal antenna or a range of external antennas. NINA-B416 comes with an internal PCB antenna while NINA-B410 and NINA-B411 are used with an external antenna, connected through a U.FL connector or module pin. The global pre-certification of u-blox modules means less compliance and verification testing, lower development costs, and an accelerated time to market for your application designs.

	NINA-B410	NINA-B411	NINA-B416
Grade			
Automotive			
Professional	•	•	•
Standard			
Radio			
Chip inside	nRF52833		
Bluetooth qualification	v5.1	v5.1	v5.1
Bluetooth Low Energy	•	•	•
Bluetooth output power EIRP [dBm]	11	11	11
Max range [meters]	1400	1400	1400
NFC	•	•	•
Antenna type (see footnotes)	U.FL	pin	pcb
Application software			
u-connectLocate	•	•	•
u-connectXpress	•	•	•
Interfaces			
UART	2	2	2
GPIO pins	26	26	26
Features			
AT command interface	•	•	•
Simultaneous GATT server and client	•	•	•
Throughput [Mbit/s]	0.8	0.8	0.8
Maximum Bluetooth connections	8	8	8
Secure boot	•	•	•
Low Energy Serial Port Service	•	•	•
Bluetooth long range	•	•	•
Direction finding (AoA/AoD)	•	•	•

pcb = Internal PCB antenna
pin = Antenna pin

U.FL = U.FL connector for an external antenna

Features

Bluetooth	v5.1 (Bluetooth Low Energy)
NFC	NFC-A tag for pairing and data
Range	1400 m
Max. conducted output power	8 dBm
Conducted sensitivity	-95 dBm (1 Mbit/s) -102 dBm (125 Kbit/s)

u-connectXpress software

NINA-B41 modules are pre-flashed with u-connectXpress and boot-loader software that interfaces through an AT command interpreter to control customer application software running on host MCUs.

Bluetooth	u-blox Low Energy Serial Port Service (SPS) GATT server and client using AT commands Beacons 2 Mbit/s modulation 125 Kbit/s modulation long range functionality Advertising extensions
Configuration over air	Wireless transmission of AT commands to control the module
Extended Data Mode™	For simultaneous AT commands and data, and multiple simultaneous data streams
HW interfaces	2 x UART, GPIO
Configuration	AT commands
Support tools	s-center
Operating modes	Central role (7 simultaneous links) Peripheral role (6 simultaneous links) Simultaneous central and peripheral roles (8 in total, where max 4 as peripheral and max 7 as central) LE 1M PHY LE 2M PHY LE CODED PHY Advertising extensions LE data length extension
Security	Secure boot Secure Simple Pairing 128-bit AES encryption Bluetooth Low Energy secure connections
Throughput over UART	780 Kbit/s

Electrical data

Power supply	1.7 to 3.6 V
Power consumption	Active TX @ 0 dBm: 6.0 mA RX only: 6.0 mA Standby: 1.3 µA Sleep: 600 nA (with wake-up on external event)

Further information

For contact information, see www.u-blox.com/contact-u-blox.

For more product details and ordering information, see the product data sheet.

Package

Dimensions	10.0 x 11.6 x 2.2 mm (NINA-B411) 10.0 x 15.0 x 2.2 mm (NINA-B410, NINA-B416)
Weight	< 1.0 g
Mounting	Machine mountable Solder pins

Environmental data, quality, and reliability

Operating temperature	-40 °C to +105 °C
Storage temperature	-40 °C to +105 °C
Humidity	RH 5 – 90% non-condensing

Certifications and approvals

Type approvals	Europe (ETSI RED), Great Britain (UKCA), US (FCC/CFR 47 part 15 unlicensed modular transmitter approval), Canada (IC RSS), Brazil (Anatel), Japan (MIC), South Korea (KCC), Taiwan (NCC) ¹ , Australia (ACMA), New Zealand, South Africa (ICASA) ¹
Health and safety	EN 62479, EN 62368-1, IEC 62368-1
Medical Electrical Equipment	EN 60601-1-2:2015
Bluetooth qualification	v5.1 (Bluetooth Low Energy)

¹ = Pending approvals

Support products

EVK-NINA-B410	Evaluation kit for NINA-B410 and NINA-B411 with u-connectXpress software and U.FL connector for external antenna
EVK-NINA-B416	Evaluation kit for NINA-B416 with u-connectXpress software and internal PCB antenna

Product variants

NINA-B410	Bluetooth Low Energy module with u-connectXpress or u-connectLocate software and U.FL antenna connector
NINA-B411	Bluetooth Low Energy module with u-connectXpress software and pin for external antenna
NINA-B416	Bluetooth Low Energy module with u-connectXpress or u-connectLocate software and internal PCB antenna

Legal Notice:

u-blox or third parties may hold intellectual property rights in the products, names, logos and designs included in this document. Copying, reproduction, or modification of this document or any part thereof is only permitted with the express written permission of u-blox. Disclosure to third parties is permitted for clearly public documents only.

The information contained herein is provided "as is". No warranty of any kind, either express or implied, is made in relation to the accuracy, reliability, fitness for a particular purpose or content of this document. This document may be revised by u-blox at any time. For most recent documents, please visit www.u-blox.com.