Product summary

ANNA-B412 module

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Stand-alone Bluetooth 5.1 low energy module

Standard

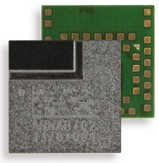
Professional

Automotive

Ultra-compact module for harsh professional environments

- Ultra-compact SiP (6.5 x 6.5) with integrated antenna
- Bluetooth 5.1, including Bluetooth long range
- u-connectXpress software for accelerated time to market
- Superior security functionality with secure boot
- Extended temperature range up to 105 °C
- Global certification

6.5 × 6.5 × 1.2 mm



Product description

ANNA-B412 is an ultra-small, high-performing, stand-alone Bluetooth low energy module. The system in package (SiP) module measures only 6.5 x 6.5 mm including an integrated antenna. The module is delivered with u-connectXpress software that provides support for u-blox Bluetooth Low Energy Serial Port Service, GATT client and server, beacons, Bluetooth long range, NFC™, and simultaneous peripheral and central roles. u-blox u-connectXpress software allows hosts to easily configure connectivity using AT commands over a UART inteface.

ANNA-B412 provides 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, ANNA-B412 also offers an extended communication range with reliable connections. With an operational temperature range of -40 °C to +105 °C, ANNA-B412 is ideal for harsh industrial or lighting applications that must operate at high ambient temperatures. Key markets are industrial automation, smart cities and buildings, medical and healthcare, and telematics. Specific applications include smart lighting, asset tracking, indoor location, sensors, and wireless-connected and configurable equipment.

ANNA-B412 comes with an internal chip antenna for ease of integration in the end-product as well as an antenna pin for use with an external antenna of choice. ANNA-B412 is globally certified for use with the internal or external antenna. This reduces time, cost, and effort for customers integrating ANNA-B412 in their designs. To ensure operation in harsh professional environments, the module is designed and manufactured according to u-blox professional grade requirements.

	ANNA-B412
Grade	
Automotive	
Professional	•
Standard	
Radio	
Chip inside	nRF52833
Bluetooth qualification	v5.1
Bluetooth low energy	•
Bluetooth output power EIRP [dBm] *	9 / 13
Max range [meters] *	800 / 1400
NFC	•
Antenna type (see footnotes)	chip / pin
Application software	
u-connectXpress	•
Interfaces	
UART	2
GPIO pins	19
Features	
Low Energy Serial Port Service	•
Throughput [Mbit/s]	0.8
Maximum Bluetooth connections	8
Secure boot	•
Simultaneous GATT server and client	•
Bluetooth long range	•
Bluetooth mesh	**
Direction finding (AoA / AoD)	**

pin = Antenna pin
chip = Internal chip antenna
* = The different values are for use with internal/external antenna
** = Available on request. Contact us.

ANNA-B412

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Features

Bluetooth	v5.1 (Bluetooth low energy)
NFC	NFC-A for pairing data
Range	Internal antenna: 800 m External antenna: 1400 m
Max. conducted output power	8 dBm
Max radiated output power (EIRP)	Internal antenna: 9 dBm External antenna: 13 dBm
Conducted sensitivity	–94 dBm (1 Mbit/s) –103 dBm (125 Kbit/s)

u-ConnectXpress software

ANNA-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, 19 x 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 Bluetooth mesh* Direction finding (AoA / AoD)*
Security	Secure boot Secure Simple Pairing 128-bit AES encryption Bluetooth Low Energy secure connections
Throughput over UART	780 Kbit/s

*Available on request. Contact us.

Electrical data

Power supply	1.7 V to 3.6 VDC
Power consumption (@ +8 dBm)	Active, advertising 31 bytes/s: 0.78 mA Standby, advertising 31 bytes/s: 35 µA Sleep: 0.4 µA

Package

Dimensions	6.5 x 6.5 x 1.2 mm
Weight	< 0.1 g
Mounting	Machine mountable Solder pins, 56-pin LGA

Environmental data, quality & 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); US (FCC/CFR 47 part 15 unlicensed modular transmitter approval); Canada (IC RSS); Japan (MIC); Taiwan (NCC); South Korea (KCC); Australia / New Zealand (ACMA); Brazil (Anatel); South Africa (ICASA)
Health and safety	EN 62479, EN 62368-1, IEC 62368-1
Bluetooth qualification	v5.1 (Bluetooth low energy)

Support products

EVK-ANNA-B412C	Full-featured evaluation kit for ANNA-B412 with u-connectXpress software, using the internal antenna
EVK-ANNA-B412U	Full-featured evaluation kit for ANNA-B412 with u-connectXpress software using the antenna pin, and an external antenna connected through a U.FL connector
USB-ANNA-B412	USB stick mini evaluation kit for ANNA-B412, with u-connectXpress software using the internal antenna

Product variants

ANNA-B412	Bluetooth low energy module with u-connectXpress software, internal antenna, and antenna pin for external antenna connection

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.