

NORA-W30 series



Stand-alone dual-band Wi-Fi modules with Bluetooth Low Energy

Compact dual-band Wi-Fi modules with embedded MCU

- Dual-band Wi-Fi 4 and Bluetooth Low Energy 5.3
- Dual-core Arm® Cortex®-M33 and -M23 compatible MCU
- Powerful open CPU for advanced customer applications
- Small footprint, multiple antenna options, pin compatible with other NORA modules
- Global certification



10.4 × 14.3 × 1.9 mm



Product description

NORA-W3 series are small, stand-alone dual-band Wi-Fi and Bluetooth Low Energy microcontroller unit (MCU) modules, perfect for integrating wireless connectivity in end products.

With Wi-Fi 4 (802.11a/b/g/n) in the 2.4 and 5 GHz bands it can be a Wi-Fi station connecting to a remote access point or act as an access point. NORA-W30 is Bluetooth 5.3 qualified and can assume peripheral or central roles, or both simultaneously. It can be a GATT client or server.

The module embeds a dual-core MCU with a powerful Arm Cortex-M33 compatible processor for the main application and an Arm Cortex-M23 compatible core for low power operation.

The NORA-W30 series include hardware security features like secure boot, trusted execution environment with Arm TrustZone™, encrypted flash, protection of debug port, and a crypto acceleration engine. Wireless communication is secure with WPA2/WPA3 authentication, TLS encryption, Bluetooth LE secure connection pairing, and HTTPS.

The modules are suited to a wide range of applications, including industrial automation, smart buildings, smart city, medical and health devices, telematics, and point-of-sales.

NORA-W306 comes with an internal PCB antenna to provide a robust low-profile solution with high performance and an extensive range, while NORA-W301 has a module pin to connect to an external antenna of choice. The NORA-W30 series will be globally certified for use with the internal antenna or a range of external antennas, which reduces time, cost and effort for customers integrating Wi-Fi and Bluetooth Low Energy in their designs.

NORA-W30 modules have the same size and position of critical pads and interfaces as other NORA modules. This offers maximum flexibility for the development of similar end-devices with different radio technologies. The modules support operation in an extended temperature range of -40°C to +105°C and are qualified for professional grade applications.

	NORA-W301	NORA-W306
Grade		
Automotive		
Professional	•	•
Standard		
Radio		
Chip inside	Realtek RTL8720DF	
Bluetooth qualification	v5.3	v5.3
Bluetooth Low Energy	•	•
Bluetooth output power [dBm]	6.5	8
Antenna type (see footnotes)	pin	pcb
Wi-Fi 2.4 / 5 [GHz]	2.4 and 5	2.4 and 5
Wi-Fi IEEE 802.11 standards	a/b/g/n	a/b/g/n
Wi-Fi output power [dBm]	20	20
Max Wi-Fi range [meters]	500	500
Application software		
Open CPU for embedded applications	•	•
Interfaces		
UART	◆	◆
USB	◆	◆
SDIO	◆	◆
SPI	◆	◆
I2C	◆	◆
I2S	◆	◆
GPIO pins	21	21
AD converters [number of bits]	12	12
Features		
MCU - main core	Arm Cortex-M33, 200 MHz	
MCU - low power core	Arm Cortex-M23, 20 MHz	
RAM [kB] - main core	512	512
RAM [kB] - low power core	64	64
Flash [MB]	4	4
FOTA	◆	◆
Arm TrustZone	◆	◆
Secure boot	◆	◆
WPA2/WPA3	◆	◆

pin = Antenna pin
pcb = Internal PCB antenna

◆ = Feature enabled by HW. Support depends on the open CPU app SW.

Features

Wi-Fi standards	802.11a/b/g/n	
Wi-Fi channels	2.4 GHz: 1-14 (depending on region) 5 GHz: 36-165, U-NII Band 1, 2, 2e, 3 (depending on region)	
Wi-Fi maximum transfer rates	802.11a/g: 54 Mbit/s	802.11b: 11 Mbit/s 802.11n: 150 Mbit/s
Output power (conducted)	Wi-Fi 2.4 GHz: 20 dBm	Wi-Fi 5 GHz: 18 dBm Bluetooth Low Energy: 8 dBm
Sensitivity (conducted)	Wi-Fi 2.4 GHz: -98 dBm	Wi-Fi 5 GHz: -93 dBm Bluetooth Low Energy: -101 dBm
Bluetooth	5.3 Bluetooth Low Energy	
Bluetooth PHY rate	1 Mbit/s, 2 Mbit/s	
Antenna	Internal PCB antenna or antenna pin for connecting to an external antenna	

Electrical data

Power supply	3.3 V (±10%)	
Power consumption	Wi-Fi Tx 17 dBm: 252 mA	Wi-Fi Rx: 63 mA Bluetooth LE Tx 8 dBm: 100 mA Bluetooth LE Rx: 60 mA Sleep mode: 75 µA Deep-sleep mode: 10 µA

Open CPU for customer applications

Customers develop and embed their own application using the Realtek SDK on the NORA-W30 modules (open CPU concept). This section describes the hardware features enabled by the NORA-W30 modules. The SDK environment for the RTL8720DF chip is required to develop connectivity and application software.

MCU system	Main core: Arm Cortex-M33 compatible, 200 MHz	Low-power core: Arm Cortex-M23 compatible, 20 MHz
HW interfaces *	UART USB SDIO SPI I2C I2S ADC GPIO	
Security	Arm TrustZone-M Cryptographic accelerator Secure bootloader Secure debug interface Flash encryption	
Development environment	Realtek Ameba D SDK Arduino IDE	

* Not all simultaneously

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	10.4 x 14.3 x 1.9 mm
Weight	< 1 g
Mounting	Machine mountable solder pads

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
RoHS directive	RoHS 2 and RoHS 3

Certifications and approvals

Type approvals	Europe (ETSI RED), Great Britain (UKCA), US (FCC/CFR 47, part 15 unlicensed modular transmitter approval), Canada (ISED RSS), Japan (MIC), Taiwan (NCC), South Korea (KCC) ¹ , Australia (ACMA) ¹ , New Zealand ¹ , Brazil (ANATEL) ¹ , South Africa (ICASA) ¹
Health and safety	EN 62368-1, IEC 62311
Medical Electrical Equipment	IEC 60601-1-2
Bluetooth qualification	Low Energy 5.3

¹ = Certification pending

Support products

EVK-NORA-W301	Evaluation kit for NORA-W301 module with antenna pin
EVK-NORA-W306	Evaluation kit for NORA-W306 module with internal PCB antenna

Product variants

NORA-W301	Multiradio wireless MCU module, open CPU, with antenna pin
NORA-W306	Multiradio wireless MCU module, open CPU, with internal PCB antenna

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