NORA-W36 series

Stand-alone dual-band Wi-Fi and Bluetooth modules

Data sheet

Abstract

NORA-W36 series are small, stand-alone, dual-band Wi-Fi and Bluetooth Low Energy modules, for integration in end products. The modules support Wi-Fi 802.11a/b/g/n in the 2.4 and 5 GHz bands as station or access point. NORA-W36 can assume Bluetooth peripheral and central roles. It can be a GATT client or server. With the u-connectXpress software pre-flashed to the modules, the host controller configures the wireless communication using high-level AT commands.

This technical datasheet provides an overview and full functional description of each module variant, including a detailed pin list, block diagram, mechanical and electrical specifications, and ordering information. Aimed towards developers and other technical staff, this document provides the critical information necessary for the design of customer applications based on the module.

Document information

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Engineering sample	Advance information	Data based on early testing. Revised and supplementary data will be published later.
Initial production	Early production information	Data from product verification. Revised and supplementary data may be published later.
Mass production / End of life	Production information	Document contains the final product specification.

This document applies to the following products:

Product name	Type number	u-connectXpress software version	Hardware version	IN/PCN reference	Product status
NORA-W361	NORA-W361-00B-00	TBD	01	N/A	In development
NORA-W366	NORA-W366-00B-00	TBD	01	N/A	In development

Contents

1 Functional description

1.1 Overview

NORA-W36 series are small, stand-alone, dual-band Wi-Fi and Bluetooth Low Energy 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 or an access point. NORA-W36 can assume Bluetooth Low Energy 5 peripheral and central roles, or both simultaneously. It can be a GATT client or server.

With the u-connectXpress software pre-flashed to the modules, end-product integration is simplified, and time-to-market reduced. The host controller configures the wireless communication using high-level AT commands without need for expertise in Wi-Fi and Bluetooth protocols stacks.

The software comes with a TCP/IP stack that allows for both point-to-point as well as point-to-multipoint use cases.

For secure communication with cloud-based applications and services, support for TLS encryption and MQTT protocols is provided. NORA-W36 has secure authentication methods like WPA2/WPA3, Wi-Fi enterprise security, and Bluetooth LE secure connections. Many other features are also supported, all accessible through the AT command interface.

The modules are suited to a wide range of applications, including industrial automation, smart buildings & homes, smart cities, metering and utilities, healthcare, and EV charging. NORA-W366 has an internal PCB antenna to provide a robust low-profile solution with high performance and an extensive range, while NORA-W361 has a module pin to connect to an external antenna of choice. The NORA-W36 series is globally certified for use with the internal antenna or a range of external antennas, reducing time, cost and effort for customers integrating Wi-Fi and Bluetooth Low Energy in their designs.

NORA-W36 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.

⚠ Approval for NORA-W36 is currently pending in some countries. See also Country approvals.

1.2 Applications

NORA-W36 series are suitable for a wide range of applications, including:
- Wi-Fi networks
- Internet of Things (IoT)
- Bluetooth Low Energy applications
- Metering and utilities
- Point-of-sales
- Healthcare
- Access to laptops, mobile phones, and similar consumer devices
- Smart buildings and homes
- EV charging
- Ethernet/Wireless gateways

1.3   Block diagram
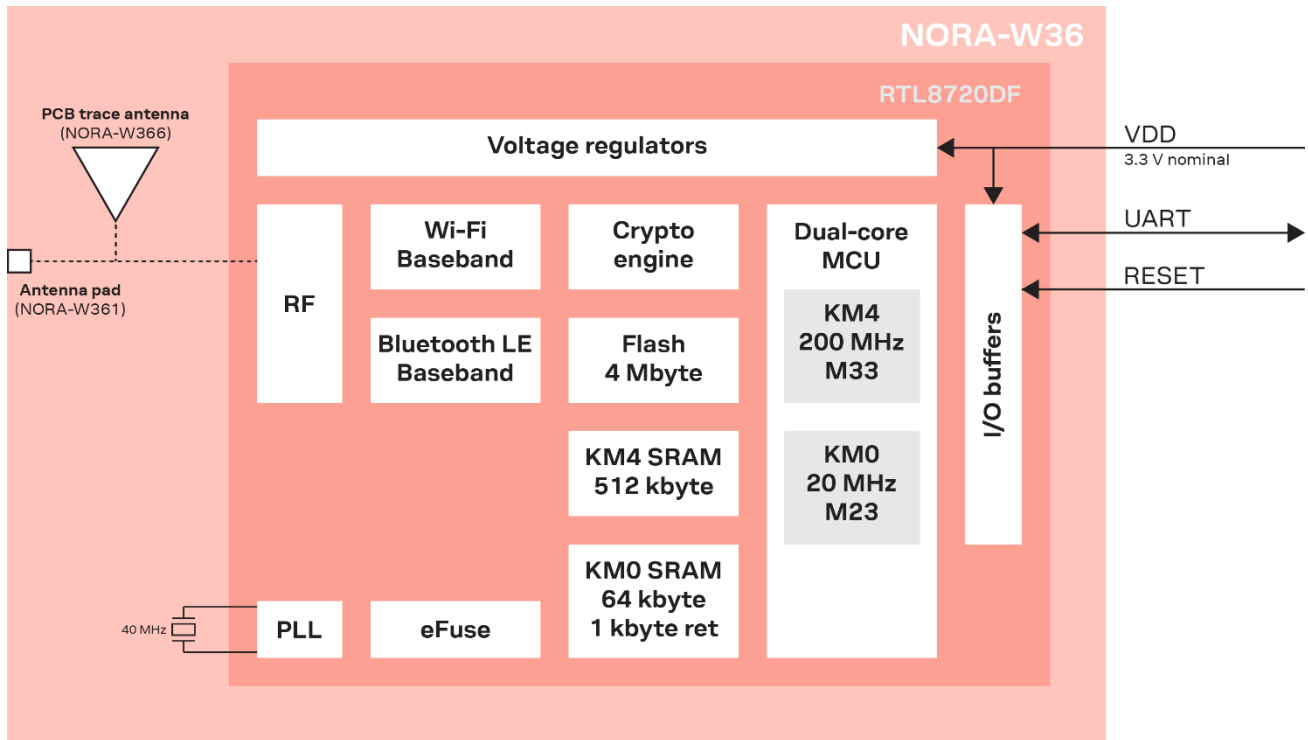
Figure 1: NORA-W36 series block diagram

1.4   Product variants

NORA-W36 series modules come with pre-flashed application software, supporting Wi-Fi 4 802.11a/b/g/n in the 2.4 GHz and 5 GHz ISM bands and Bluetooth Low Energy 5 in the 2.4 GHz ISM band. The host system can set up and control the module through the AT command interface. NORA-W36 product variants share the same pin-out, footprint, and size of 14.3 mm x 10.4 mm x 1.9 mm.

1.4.1   NORA-W361

NORA-W361 has no internal antenna. The RF signal for routing to an external antenna or antenna connector signal is exposed through a dedicated module pin.

1.4.2   NORA-W366

NORA-W366 is equipped with an internal PCB trace antenna, using antenna technology licensed from Abracon. The RF signal is not connected to any module pin.

1.5   Radio performance

The radio provides support for Wi-Fi 4, IEEE 802.11a/b/g/n in the 2.4 GHz and 5 GHz ISM bands and Bluetooth LE communication in the 2.4 GHz ISM band, as shown in Table 1.

Wi-Fi	Bluetooth Low Energy
IEEE 802.11a/b/g/n	Bluetooth LE 5
Band support Station mode: 2.4 GHz, channels 1-13* 5 GHz, channels 36-165* Access Point mode: 2.4 GHz, channels 1-13*	Band support 2.4 GHz, 40 channels

Wi-Fi	Bluetooth Low Energy
5 GHz, channels 36-165*	
Typical conducted output power: 2.4 GHz, 21 dBm 5 GHz, 19 dBm	Typical conducted output power 10 dBm
Typical radiated output power: 2.4 GHz, 24 dBm EIRP** 5 GHz, 22 dBm EIRP**	Typical radiated output power 13 dBm EIRP**
Conducted sensitivity –98 dBm	Conducted sensitivity LE1M, –101 dBm LE2M, –97 dBm
Data rates: IEEE 802.11a: 6 / 9 / 12 / 18 / 24 / 36 / 48 / 54 Mbps IEEE 802.11b: 1 / 2 / 5.5 / 11 Mbps IEEE 802.11g: 6 / 9 / 12 / 18 / 24 / 36 / 48 / 54 Mbps IEEE 802.11n: MCS 0-7, HT20 (6.5-150 Mbps), HT40	Data rates: 1 / 2 Mbps 125 / 500 kbps

* Maximum support depends on the region.

** RF power including maximum antenna gain (3 dBi).

Table 1: NORA-W36 series Wi-Fi and Bluetooth characteristics

⚠️ Output power and sensitivity values are provisional.

1.6 Software options

1.6.1 u-connectXpress software

NORA-W36 series modules come with the pre-flashed application software with integrated TCP/IP and Bluetooth protocol stacks, supporting Wi-Fi 4, IEEE 802.11a/b/g/n dual-band 2.4 GHz and 5 GHz operation and Bluetooth Low Energy 5. NORA-W36 modules provide top grade security, thanks to secure boot, which ensures the module boots up only with original u-blox software. The modules additionally provide end-to-end security on the wireless link with the latest 802.11i (WPA3) standard and enterprise security that provides a secure connection to the infrastructure.

For secure communication with cloud-based applications and services, support for TLS encryption and MQTT protocols is provided. NORA-W36 has secure authentication methods like WPA2/WPA3, Wi-Fi enterprise security, and Bluetooth LE secure connections.

1.6.2 AT command support

NORA-W36 series modules are configured and controlled using high-level AT commands over UART without need for expertise in Wi-Fi and Bluetooth protocols stacks. There are simple commands to establish communication to TCP server or read out characteristics from a remote GATT Bluetooth LE service and more.

1.6.3 Software upgrade

NORA-W36 u-connectXpress software includes a bootloader for flashing the module over the UART interface. The file download uses standard XMODEM protocol.

Detailed information on how to upgrade the software is provided in the NINA-W36 series system integration manual [1].

1.7 MAC addresses

NORA-W36 series modules are assigned a block of four MAC addresses.

MAC address	Assignment
Base address	Wi-Fi station
Base address + 1	Wi-Fi access point
Base address + 2	Bluetooth LE device address
Base address + 3	Unused

Figure 2: MAC addresses

1.8 Power modes

NORA-W36 series modules are power efficient devices capable of operating in different power saving modes and configurations.

Power mode	Description	Conditions
Active	Normal operation	
Sleep	TBD	TBD
TBD	TBD	TBD

Table 2: Power modes

1.8.1 Wake sources

NORA-W36 can wake from sleep by the following sources.

Peripheral	Source	Remarks
TBD	TBD	

Table 3: Wake sources

2   Interfaces

2.1   Power supply

The power for NORA-W36 series modules is supplied through **VDD** pins with a nominal voltage of 3.3 VDC. The input voltage is also the input / output (I/O) reference voltage for interfacing to external circuitry.

⚠ The system power supply circuit must be able to support peak power. As the current drawn from **VDD** can vary significantly based on Wi-Fi and Bluetooth LE power consumption profiles.

NORA-W36 series modules use an integrated voltage converter to transform and stabilize the supply voltage applied to the **VDD** pins. The voltage converter operates in linear low drop-out mode (LDO) or switching power supply (SPS) mode. SPS is the default mode.

2.2   Low frequency clock

NORA-W36 series modules have an internal low frequency clock which is derived from the main clock.

2.3   Module reset

NORA-W36 series modules can be reset (rebooted) with a low-level input on the **nRESET** pin. The logic level of this pin is normally set high using an internal pull-up resistor. The low-level input triggers a "hardware reset" of the module. The **nRESET** signal should be driven by an open drain, open collector, or contact switch. The chip works at the minimum power when **nRESET** is low (off).

2.4   System control signals

The following input signals are used to control the system:

- **nRESET** is used to reset the system. See also Module reset.
- If **SWITCH_2** is driven low during start up, the UART serial settings are restored to their default values.
- If both **SWITCH_1** and **SWITCH_2** are driven low during startup, the system enters bootloader mode.
- If both **SWITCH_1** and **SWITCH_2** are driven low during start up and held low for 10 seconds, the system will exit the bootloader mode and restore all settings to their factory defaults.

2.5   RF antenna interface

The RF antenna interface of NORA-W36 modules supports Wi-Fi and Bluetooth LE on the same antenna. The different communication protocols are time divided on the antenna to switch between the Bluetooth and Wi-Fi data. Although communication using these different protocols is (more or less) transparent in the application, these protocols are never active at the same time in the module antenna.

NORA-W36 series modules support either an internal antenna (NORA-W366) or external antennas connected through a dedicated antenna pin (NORA-W361).

2.5.1   Internal antenna

NORA-W366 modules have internal antennas that are specifically designed and optimized for NORA modules. NORA-W366 module is equipped with a dual-band PCB trace antenna tuned for the 2.4 GHz and 5 GHz ISM bands.

The suggestion for the PCB trace antenna in NORA-W366 modules is to place it in the middle – along the side edge of the host PCB.

For NORA-W366 designs, keep a minimum clearance of 5 mm between the antenna and the casing. Also, keep at least 10 mm of free space around the metal antenna including the area directly below it. If a metal enclosure is required, use NORA-W361 and an external antenna.

It is beneficial to have a large solid ground plane on the host PCB with a good grounding on the module. Minimum ground plane size is 24x30 mm but more than 50x50 mm is recommended.

For more information about antenna-related design, see also the NORA-W36 series system integration manual [1].

⚠ The **ANT** signal solder pin is not connected on the NORA-W366 module.

2.5.2   External RF antenna interface

The NORA-W361 module has an antenna signal (**ANT**) pin with a characteristic impedance of 50 Ω for using an external antenna. The antenna signal supports both Tx and Rx.

The external antenna, for example, can be an SMD antenna (or PCB integrated antenna) on the host board. An antenna connector for use with an external antenna through a coaxial cable could also be implemented. A cable antenna might be necessary if the module is mounted in a shielded enclosure such as a metal box or cabinet.

An external antenna connector (U.FL connector) reference design is available and must be followed to comply with the NORA-W36 FCC/ISED modular approvals. See the NORA-W36 series system integration manual [1] for the U.FL reference design and the list of approved antennas.

2.6   Data interfaces

2.6.1   UART

The Universal Asynchronous Receiver Transmitter (UART) is an asynchronous serial interface consisting of up to four signals – transmit data (**UART_TXD**), receive data (**UART_RXD**), request-to-send (**UART_RTS**) handshake, and clear-to-send (**UART_CTS**) handshake. The handshake signals are optional, though recommended at higher speeds. Two additional signals are used to control the state of the NORA-W36 module, data terminal ready (**UART_DTR**) and data set ready (**UART_DSR**).

3　Pin definition

3.1　NORA-W36 pin definition
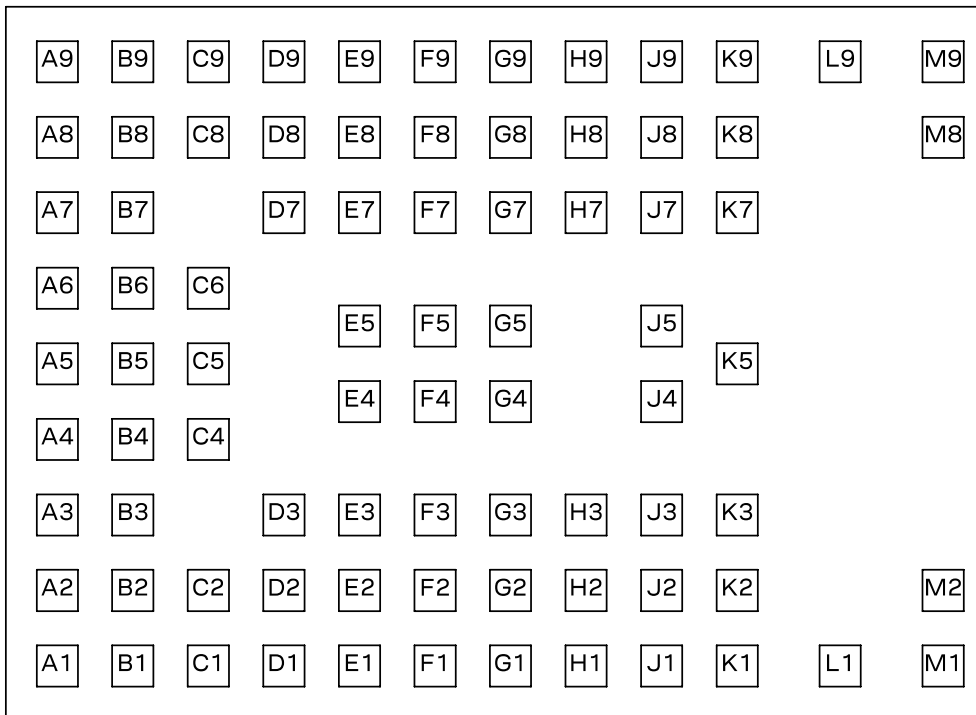
TOP VIEW

Figure 3: Pin layout

3.1.1　NORA-W36 u-connectXpress pin assignments

Table 4 shows the NORA-W36 u-connectXpress module pin assignments.

No	Name	I/O	Description
A1	VSS	Power	Ground pad
A2	n/c	-	No connection
A3	n/c	-	No connection
A4	n/c	-	No connection
A5	DBG_TX	O	Debug UART TX data
A6	DBG_RX	I	Debug UART RX data
A7	VDD	Power	3.0 VDC to 3.6 VDC power supply input and I/O reference voltage
A8	VDD	Power	3.0 VDC to 3.6 VDC power supply input and I/O reference voltage
A9	VSS	Power	Ground pad
B1	RSVD_B1	O	Reserved – do not connect
B2	VSS	Power	Ground pad
B3	RSVD_B3	O	Reserved – do not connect
B4	n/c	-	No connection
B5	n/c	-	No connection
B6	n/c	-	No connection

No	Name	I/O	Description
B7	VDD	Power	3.0 VDC to 3.6 VDC power supply input and I/O reference voltage
B8	VSS	Power	Ground pad
B9	n/c	-	No connection
C1	RSVD_C1	I	Reserved – do not connect
C2	RSVD_C2	O	Reserved – do not connect
C4	n/c	-	No connection
C5	n/c	-	No connection
C6	n/c	-	No connection
C8	SWITCH_2	I	Switch 2
C9	n/c	-	No connection
D1	n/c	-	No connection
D2	n/c	-	No connection
D3	n/c	-	No connection
D7	n/c	-	No connection
D8	SWITCH_1	I	Switch 1
D9	n/c	-	No connection
E1	n/c	-	No connection
E2	n/c	-	No connection
E3	n/c	-	No connection
E4	VSS	Power	Ground pad
E5	VSS	Power	Ground pad
E7	n/c	-	No connection
E8	UART_DTR	O	UART_DTR
E9	UART_DSR	I	UART_DSR
F1	n/c	-	No connection
F2	n/c	-	No connection
F3	n/c	-	No connection
F4	VSS	Power	Ground pad
F5	VSS	Power	Ground pad
F7	n/c	-	No connection
F8	UART_RTS	O	UART_RTS
F9	UART_CTS	I	UART_CTS
G1	n/c	-	No connection
G2	n/c	-	No connection
G3	n/c	-	No connection
G4	n/c	-	No connection
G5	n/c	-	No connection
G7	n/c	-	No connection
G8	UART_TXD	O	UART_TXD
G9	UART_RXD	I	UART_RXD
H1	n/c	-	No connection
H2	RSVD_H2	I/O	Reserved – do not connect
H3	n/c	-	No connection
H7	n/c	-	No connection
H8	GREEN	O	Green LED (active low)

No	Name	I/O	Description
H9	BLUE	O	Blue LED (active low)
J1	n/c	-	No connection
J2	RSVD_J2	O	Reserved – do not connect
J3	nRESET	I	External system reset input
J4	n/c	-	No connection
J5	n/c	-	No connection
J7	n/c	-	No connection
J8	RED	O	Red LED (active low)
J9	RSVD_J9	I/O	Reserved – do not connect
K1	n/c	-	No connection
K2	VSS	Power	Ground pad
K3	VSS	Power	Ground pad
K5	VSS	Power	Ground pad
K7	VSS	Power	Ground pad
K8	VSS	Power	Ground pad
K9	ANT	I/O	Single-ended antenna connection Only connected on NORA-W361
L1	VSS	Power	Ground pad
L9	VSS	Power	Ground pad
M1	VSS	Power	Ground pad
M2	VSS	Power	Ground pad
M8	VSS	Power	Ground pad
M9	VSS	Power	Ground pad

Table 4: NORA-W36 u-connectXpress pinout table

4 Electrical specifications

Stressing the device above one or more of the ratings listed in the Absolute maximum ratings may cause permanent damage. These are stress ratings only.

Operating the module at these or at any conditions other than those specified in the Recommended operating conditions should be avoided. Exposure to absolute maximum rating conditions for extended periods can affect device reliability.

☞ All given application information is only advisory and does not form part of the specification.

4.1 Absolute maximum ratings

Symbol	Description	Condition	Min	Max	Unit
VDD	Module supply voltage	Input DC voltage at VDD pins	TBD	TBD	V
$I_{VDD\ MAX}$	Absolute maximum power consumption	3.3 VDC power supply	TBD	TBD	mA
DPV	Digital pin voltage	Input DC voltage at any digital I/O pin	TBD	TBD	V
P_ANT	Maximum power at receiver	Input RF power at antenna pin	TBD	TBD	dBm
T_{STR}	Storage temperature		-40	+125	ºC

Table 5: Absolute maximum ratings

⚠ The product is not protected against overvoltage or reversed voltages. If necessary, voltage spikes exceeding the power supply voltage specification shown in Table 5 must be limited to values within the specified boundaries by using appropriate protection devices.

4.1.1 ESD characteristics

Parameter	Min.	Typical	Max.	Unit	Remarks
Human body model (HBM)			±2000	V	JEDEC EIA/JESD22-A114
Charge device model (CDM)			±500	V	JEDED EIA/JESD22-C101

Table 6: ESD characteristics

4.2 Recommended operating conditions

4.2.1 Operating temperature

Parameter	Min.	Max.	Unit
Operating temperature	-40	+105	ºC

Table 7: Temperature range

4.2.2 Supply / power pins

The input supply can operate at a nominal input voltage of 3.3 VDC.

Symbol	Parameter	Condition	Min	Typ	Max	Unit
VDD	Input supply voltage	Ambient temperature -40 ℃ to +105 ℃	3.00	3.30	3.60	V

Table 8: Input characteristics of voltage supply pins

4.2.3 nRESET pin

Pin name	Parameter	Min	Typ	Max	Unit
nRESET	Low-level input	0		0.2*VDD	V
	Internal pull-up resistance		10		kΩ

Pin name	Parameter	Min	Typ	Max	Unit
$t_{STARTUP}$	Startup time after release of reset		TBD	TBD	ms
t_{RESET}	Minimum **nRESET** low pulse	1	1		ms

Table 9: nRESET pin characteristics

4.2.4 Digital pins

Digital pin specifications depend on the power supply voltage, **VDD**.

Pin name	Parameter	Min	Typ	Max	Unit	Remarks
Any digital pin	Input characteristic: Low-level input	0		0.8	V	
	Input characteristic: high-level input	2.0		VDD	V	
	Output characteristic: Low-level output	0		0.4	V	
	Output characteristic: High-level output	2.4		VDD	V	
	Drive capability	3.6		23.3	mA	For drive settings, see [2]
	Loading capacitance		15		pF	
	Pull-up/pull-down resistance	4.7		50	kΩ	For pull settings, see [2]

Table 10: Digital pin characteristics at VDD=3.3 VDC

4.2.5 Current consumption

The typical current consumption of a NORA-W36 module is shown in Table 11. The current consumption is highly dependent on the application implementation. All measurements taken with 3.3 V supply at 25 °C except as noted.

☞ The current consumption figures are estimated and preliminary.

Power mode	Activity	Min.	Typ.	Unit	Remarks
Wi-Fi	Wi-Fi Tx packet P_{OUT} 21 dBm		450	mA	
	Wi-Fi connected (idle)		20	mA	
	Wi-Fi Rx and listening		52	mA	
Bluetooth LE	Bluetooth Tx Pout 4.45 dBm		100	mA	129 mA @ 12 dBm P_{OUT}
	Bluetooth Rx and listening		56	mA	
Active	CPU 200 MHz RF off	18	22	mA	

Table 11: Current consumption during typical use cases

4.2.6 Wi-Fi radio characteristics

V_{DD} = 3.3 V, T_{amb} = 25 °C

Parameter	Operation mode	Specification	Unit
RF frequency range	802.11a/n	5.180 – 5.825	GHz
	802.11b/g/n	2.412 – 2.484	GHz
Modulation	802.11b	CCK and DSSS	
	802.11a/g/n	OFDM	
Supported Data Rates	802.11a	6, 9, 12, 18, 24, 36, 48, 54	Mbit/s

Parameter	Operation mode		Specification	Unit
	802.11b		1, 2, 5.5, 11	Mbit/s
	802.11g		6, 9, 12, 18, 24, 36, 48, 54	Mbit/s
	802.11n		MCS0 – MCS7	
Supported Bandwidth	802.11n		20, 40	MHz
Supported Guard Interval	802.11n		400, 800	ns
Conducted Transmit Power (typical)	2.4 GHz CCK	1 Mbit/s	20 typ. / 21 max.	dBm[*]
		11 Mbit/s	18 typ. / 21 max.	dBm[*]
	2.4 GHz OFDM	6 Mbit/s	20 typ. / 21 max.	dBm[*]
		54 Mbit/s	17 typ. / 18 max.	dBm[*]
	2.4 GHz HT20 / HT40	MCS0	19 typ. / 20 max.	dBm[*]
		MCS7	16 typ. / 17 max.	dBm[*]
	5 GHz OFDM	6 Mbit/s	18 typ. / 19 max.	dBm[*]
		54 Mbit/s	14 typ. / 15 max.	dBm[*]
	5 GHz HT20 / HT40	MCS0	17 typ. / 18 max.	dBm[*]
		MCS7	13 typ. / 14 max.	dBm[*]
Receiver Sensitivity (typical)	2.4 GHz CCK	1 Mbit/s	–98	dBm
		11 Mbit/s	–91	dBm
	2.4 GHz OFDM	6 Mbit/s	–95	dBm
		54 Mbit/s	–77	dBm
	2.4 GHz HT20	MCS0	–95	dBm
		MCS7	–75	dBm
	2.4 GHz HT40	MCS0	–93	dBm
		MCS7	–72	dBm
	5 GHz OFDM	6 Mbit/s	–93	dBm
		54 Mbit/s	–76	dBm
	5GHz HT20	MCS0	–93	dBm
		MCS7	–74	dBm
	5 GHz HT40	MCS0	–91	dBm
		MCS7	–71	dBm

* There is lower output power on band edge channels and also on the highest data rates.

Table 12: Wi-Fi radio characteristics

4.2.7 Bluetooth LE characteristics

V_{DD} = 3.3 V, T_{amb} = 25 °C

Parameter	Specification	Unit
RF Frequency Range	2.400 – 2.4835	GHz
Supported Modes	Bluetooth LE 5	
Number of channels	40	
Modulation	GFSK	
Transmit Power (typical)	10 ± 1	dBm
Receiver Sensitivity (typical)	-97 ± 2	dBm

* Conducted output power.

Table 13: Bluetooth LE characteristics

4.2.8 Antenna radiation patterns

Antenna patterns for approved antennas associated with NORA-W361 can be found in the respective antenna data sheet. See the NORA-W36 system integration manual [1] for the list of approved antennas.
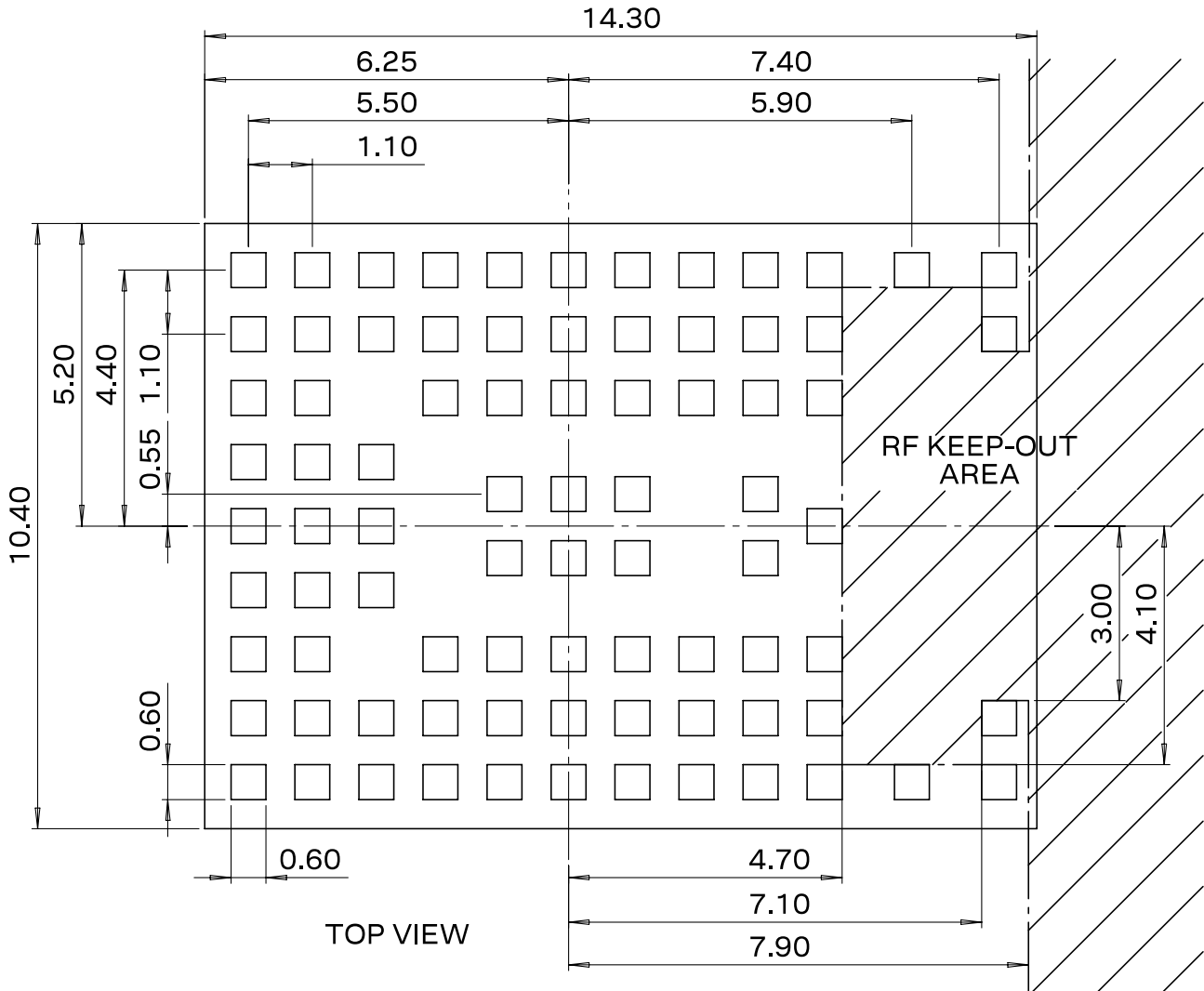
☞ Radiation patterns will be added for NORA-W366 modules when test data is available.

5   Mechanical specifications

5.1   NORA-W36 footprint dimensions

Figure 4 shows the common footprint and dimensions of NORA-W36 series modules that are shared across the whole product family.
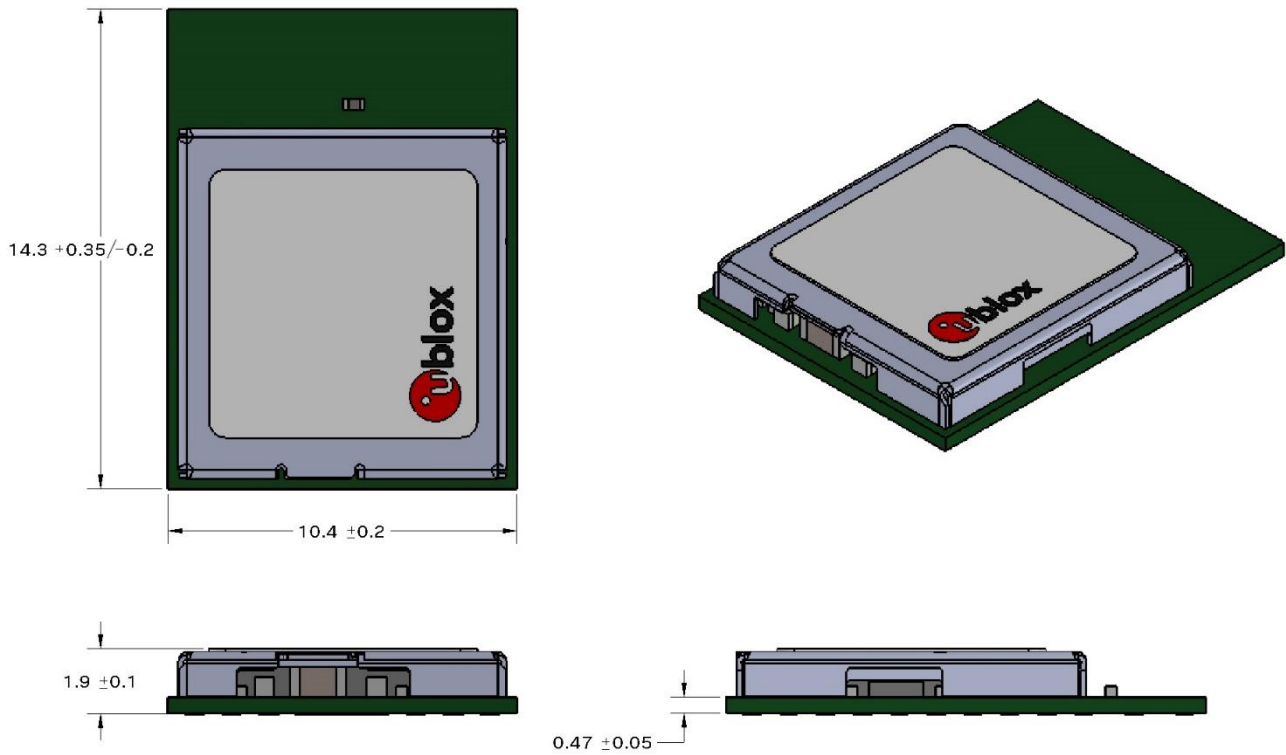

All dimensions in mm.

Figure 4: NORA-W36 footprint dimensions

☞   RF keep-out area only required for NORA-W366

5.2 NORA-W36 mechanical specifications
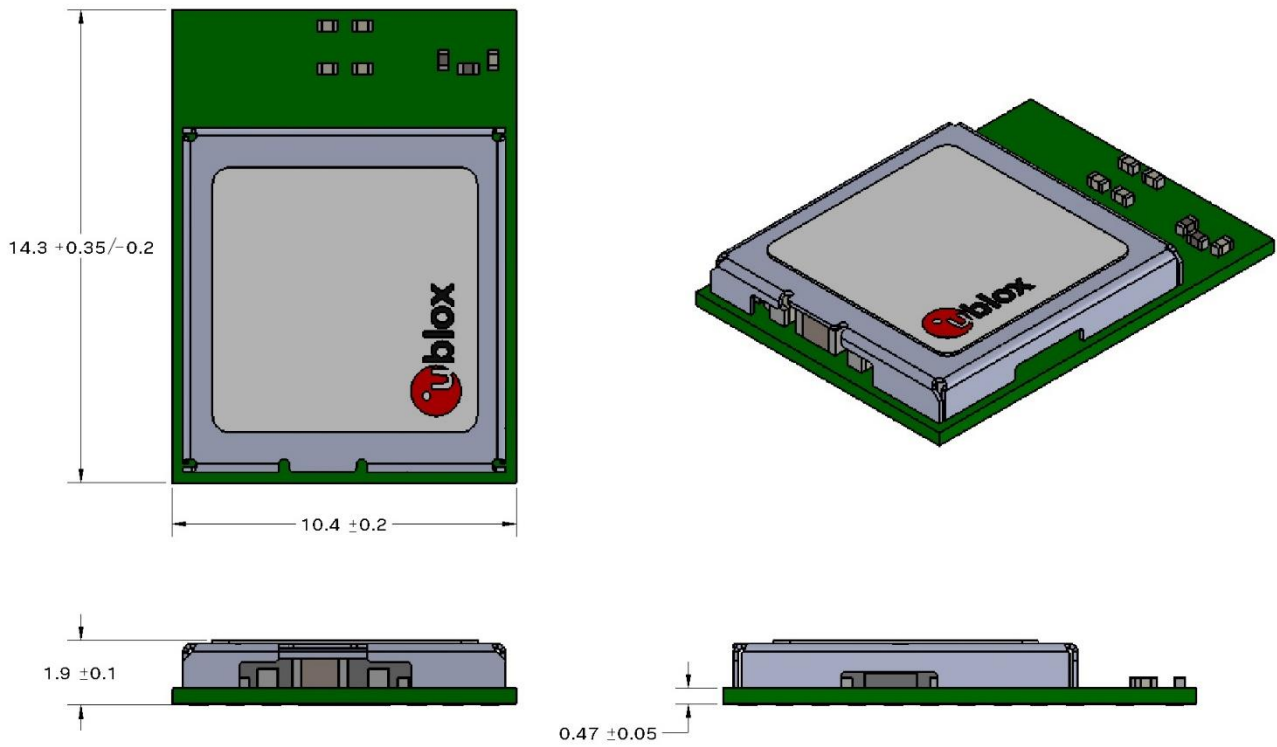
5.2.1 NORA-W361 mechanical specifications

Dimensions in mm

Figure 5: NORA-W361 mechanical specification

5.2.2   NORA-W366 mechanical specifications

Dimensions in mm

Figure 6: NORA-W366 mechanical specification

6   Qualifications and approvals

6.1   Country approvals

⚠️   Approvals for NORA-W36 series are currently pending.

The NORA-W36 module series will be certified for use in the following countries/regions:

- Europe (RED)
- USA (FCC)
- Canada (ISED)
- Japan (MIC)
- Taiwan (NCC)
- South Korea (KCC)
- Brazil (ANATEL)
- Australia and New Zeeland (ACMA)
- South Africa (ICASA)

☞   For detailed information about the regulatory requirements that must be met when using NORA-W36 modules in an end-product, see the NORA-W36 series certification application note (TBD).

6.2   Bluetooth qualifications

NORA-W361 and NORA-W366 modules will be qualified as a controller subsystem according to the Bluetooth 5 specification.

Model	Product type	QD ID	Listing date
NORA-W361	End-product	-	Pending
NORA-W366	End-product	-	Pending

Table 14: NORA-W361/NORA-W366 Bluetooth QD ID

For information on how to list and declare your product, see the NORA-W36 series system integration manual [1].

6.3   Environmental

6.3.1   RoHS

NORA-W36 series modules are in compliance with Directive 2011/65/EU, 2015/863/EU of the European Parliament and the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

6.3.2   REACH

NORA-W36 series modules do not contain the SVHC (Substance of Very High Concern), as defined by Directive EC/1907/2006 Article according to REACH Annex XVII.

6.4   Antennas

A PCB antenna is included on NORA-W366. For NORA-W361, see the NORA-W36 system integration manual [1] for information on approved antennas.

7   Product handling

7.1   Packaging

⚠️   NORA-W36 series modules are currently in development, as shown in the Product status. Consequently, the information in this section will be valid and available only when the module is fully tested and approved in the Initial Production stage.

7.1.1   Reels

NORA-W36 series modules are delivered as hermetically sealed, reeled tapes to enable efficient production, production lot set-up and tear-down. For more information about packaging, see the Product packaging reference guide [2].

NORA-W36 modules are delivered in quantities of 500 pieces on a reel.

The reel types for NORA-W36 modules are shown in Table 15, with more detailed information included in the Product packaging reference guide [2].

Model	Reel type
NORA-W361	A3
NORA-W366	A3

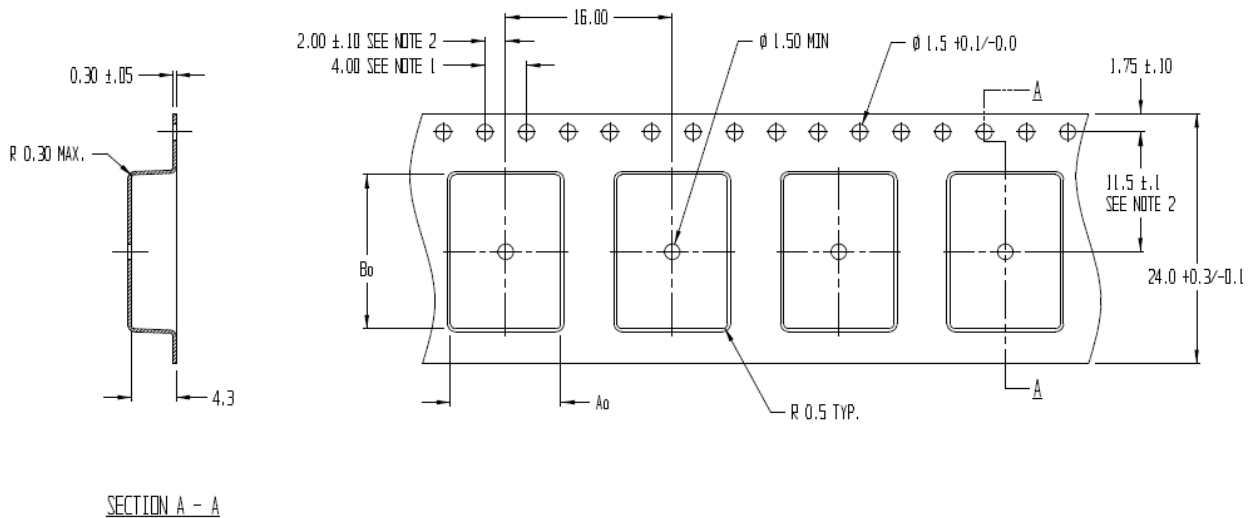**Table 15: Reel types for different NORA-W36 series modules**

7.1.2   Tapes

Figure 7 and Figure 8 show the position and orientation of NORA-W36 modules as they are delivered on tape. The dimensions of the tapes are specified in Figure 9.

Figure 7: NORA-W361 module on tape orientation

Figure 8: NORA-W366 module on tape orientation

NOTES:
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED
   AS TRUE POSITION OF POCKET, NOT POCKET HOLE
3. Ao AND Bo ARE CALCULATED ON A PLANE AT A DISTANCE "R"
   ABOVE THE BOTTOM OF THE POCKET.

Figure 9: NORA-W361/NORA-W366 tape dimensions

7.2   Moisture sensitivity levels

⚠   The NORA-W36 series modules are Moisture Sensitive Devices (MSD) in accordance with the IPC/JEDEC specification.

The Moisture Sensitivity Level (MSL) relates to the required packaging and handling precautions. The NORA-W36 series modules are rated at MSL level 4. For more information regarding moisture sensitivity levels, labeling, and storage, see the Product packaging reference guide [2].

☞   For MSL standards, see IPC/JEDEC J-STD-020, which can be downloaded from www.jedec.org.

7.3   Reflow soldering

Reflow profiles are to be selected according to u-blox recommendations. See NORA-W36 series system integration manual [1] for more information.

⚠   Failure to observe these recommendations can result in severe damage to the device.

7.4 ESD precautions

⚠ NORA-W36 series modules contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD). Handling the NORA-W36 series modules without proper ESD protection may destroy or damage them permanently.

NORA-W36 series modules are electrostatic sensitive devices (ESD) and require special ESD precautions typically applied to ESD sensitive components. See also Maximum ESD ratings.

Proper ESD handling and packaging procedures must be applied throughout the processing, handling and operation of any application that incorporates the NORA-W36 series module. The ESD precautions should be implemented on the application board where the module is mounted as described in the NORA-W36 series system integration manual [1].

⚠ Failure to observe these recommendations can result in severe damage to the device.

8   Labeling and ordering information

8.1   Product labeling

The labels (8 x 8 mm) of the NORA-W36 series modules described in the section include important product information.

Figure 10 shows the label of all the NORA-W36 series modules, which includes product type number and revision, production date, and data matrix that bears a unique serial number and the u-blox logo.
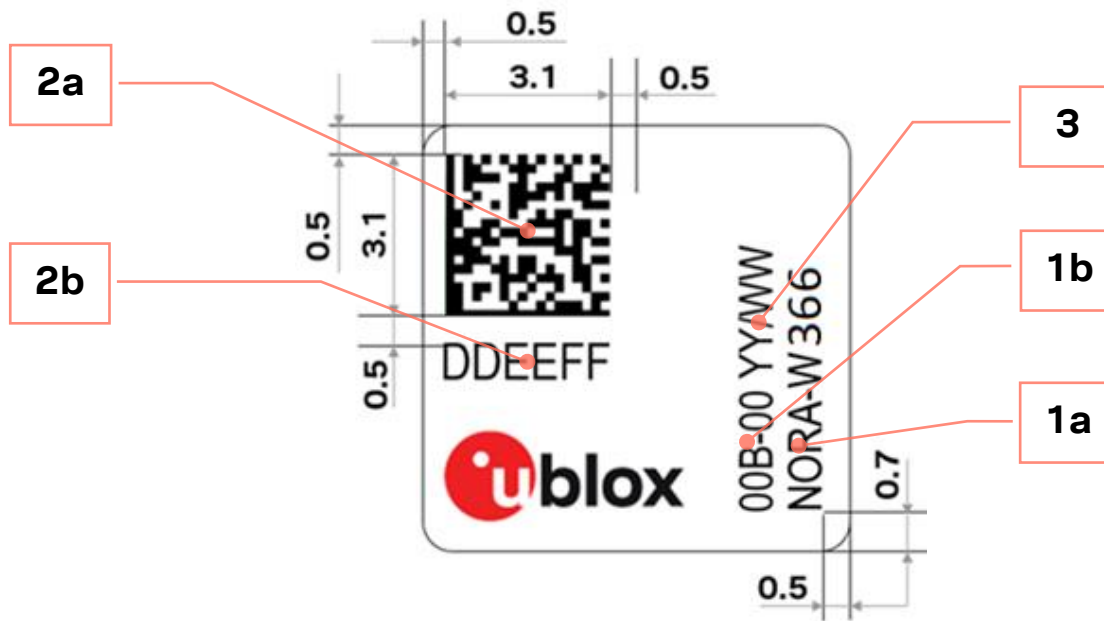
All units in mm unless specified otherwise

Figure 10: Location of product type number on the NORA-W36 series module label

Reference	Description
1a	Product Name (Applicable model names: NORA-W361, NORA-W366).
1b	Product type number suffix.
2a	Data Matrix with unique serial number comprising 19 alphanumeric symbols: - The first 3 symbols are used for production tracking and are an abbreviated representation of the Type number that is unique to each module variant. - The following 12 symbols represent the unique hexadecimal Bluetooth address of the module AABBCCDDEEFF, and - The last 4 symbols represent the hardware and firmware version encoded HHFF.
2b	The six last hex symbols of the MAC address (AABBCC**DDEEFF**).
3	Date of production encoded YY/WW (year/week).

Table 16: NORA-W36 series label description

8.2   Ordering information

Ordering code	Product
NORA-W361-00B	Module with antenna pin. u-connectXpress version. Using RTL8720DF.
NORA-W366-00B	Module with internal PCB trace antenna. u-connectXpress version. Using RTL8720DF.

Table 17: Product ordering codes

Appendix

A Glossary

Abbreviation	Definition
ADC	Analog to Digital Converter
ARM	Arm (Advanced RISC Machines) Holdings
BOD	Brown-Out Detect
CDM	Charge Device Model
COMP	Comparator
CPU	Central Processing Unit
ESD	ElectroStatic Discharge
IEEE	Institute of Electrical and Electronics Engineers
GATT	Generic Attributes
GPIO	General Purpose Input / Output
HBM	Human Body Model
I2C	Inter Integrated Circuit
I2S	Inter-IC Sound
IOT	Internet of Things
IR	Infrared Radiation
LAN	Local Area Network
LPO	Low Power Oscillator
MAC	Media Access Controller
MCU	Microcontroller Unit
MSL	Moisture Sensitivity Level
PCB	Printed Circuit Board
PCBA	Printed Circuit Board Assembly
PWM	Pulse Width Modulation
QDEC	Quadrature Decoder
RF	Radio Frequency
RTC	Real-Time Clock
SDIO	Secure Digital Input / Output
SPI	Serial Peripheral Interface
SWD	Serial Wire Debug
TBD	To Be Decided
TLS	Transport Layer Security
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
USI	Universal Serial Interface
WLAN	Wireless LAN
WPA	Wi-Fi Protected Access

Table 18: Explanation of the abbreviations and terms used

Related documentation

[1] NORA-W36 system integration manual, UBX- 22021119
[2] Product packaging reference guide, UBX-14001652

☞ For product change notifications and regular updates of u-blox documentation, register on our website, www.u-blox.com.

Revision history

Revision	Date	Name	Comments
R01	12-Oct-2022	brec	Initial release
R02	8-Nov-2022	brec	Revised disclosure restriction class.

Contact

For further support and contact information, visit us at www.u-blox.com/support.