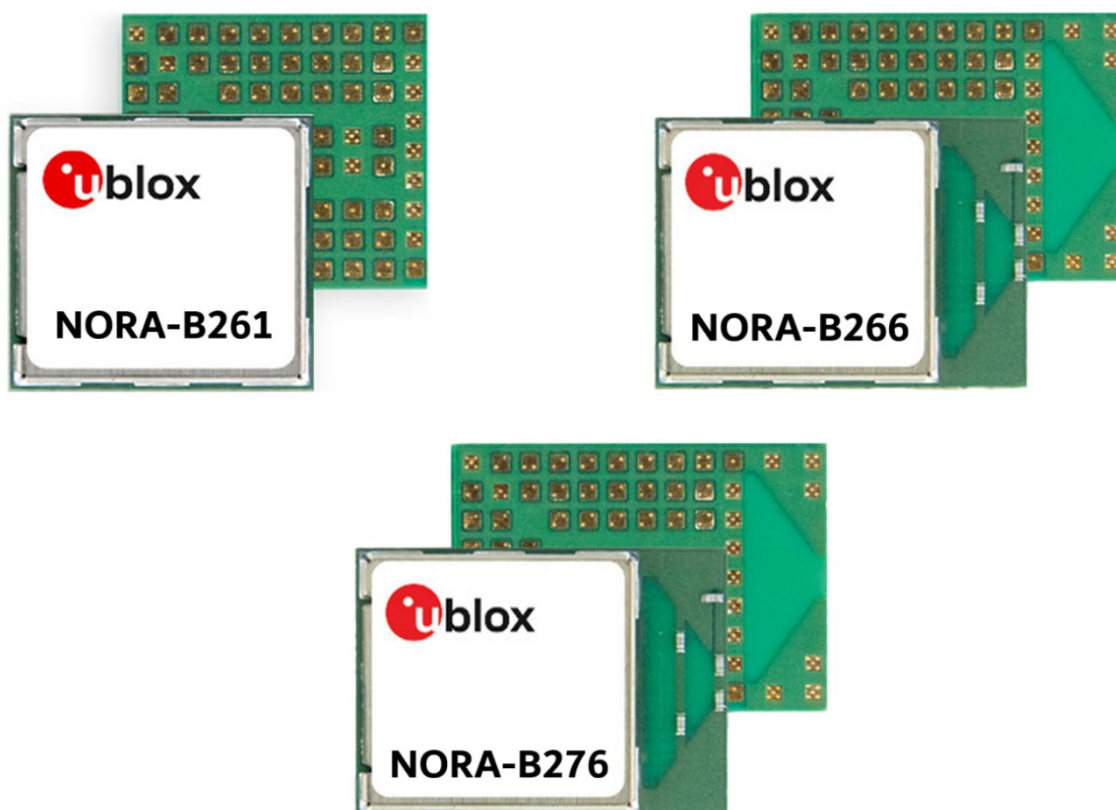


# NORA-B2 uCX data sheet

Stand-alone Bluetooth® modules

Data sheet



## Abstract

Aimed towards developers and other technical staff, this document provides important information necessary for the design of customer applications based on the module. It includes an overview and comprehensive functional description of each NORA-B2 module variants – together with a detailed pin list, block diagram, mechanical and electrical specification, and more.

# Document information

|                               |                                |            |
|-------------------------------|--------------------------------|------------|
| <b>Title</b>                  | <b>NORA-B2 uCX data sheet</b>  |            |
| <b>Subtitle</b>               | Stand-alone Bluetooth® modules |            |
| <b>Document type</b>          | Data sheet                     |            |
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| <b>Disclosure restriction</b> | C1-Public                      |            |

| <b>Product status</b>           | <b>Corresponding content status</b> |                                                                                        |
|---------------------------------|-------------------------------------|----------------------------------------------------------------------------------------|
| Functional sample               | Draft                               | For functional testing. Revised and supplementary data will be published later.        |
| In development / Prototype      | Objective specification             | Target values. Revised and supplementary data will be published later.                 |
| 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/<br>End of life | Production information              | Document contains the final product specification.                                     |

This document applies to the following products:

| <b>Product name</b> | <b>Type number</b> | <b>Hardware version</b> | <b>PCN reference</b> | <b>Product Status</b> |
|---------------------|--------------------|-------------------------|----------------------|-----------------------|
| NORA-B261           | NORA-B261-00B-00   | 01                      | N/A                  | Initial Production    |
| NORA-B266           | NORA-B266-00B-00   | 02                      | N/A                  | Initial Production    |
| NORA-B276           | NORA-B276-00B-00   | 02                      | N/A                  | Initial Production    |

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# 1 Functional description

## 1.1 Overview

Based on the Nordic Semiconductor nRF54L series Bluetooth® LE System on Chip (SoC), the NORA-B2 is a series of small stand-alone modules includes Arm® Cortex®-M33 processor, which provides a floating-point unit (FPU), digital signal processor (DSP) instruction set, and CryptoCell™-312 security architecture. It also features a 128 MHz RISC-V coprocessor. NORA-B2 modules are qualified against Bluetooth® Core 6.0.

Shipped with pre-flashed u-connectXpress software, NORA-B2 modules simplify end-product integration and reduce the time-to-market for end-user applications. The host controller configures and controls the wireless communication using high-level AT commands – without the need for expertise in Bluetooth protocols stacks.

NORA-B2 series operate at ambient temperatures range of -40 °C to 85 °C. The modules offer multiple antenna options, including antenna pin and on-board PCB trace antenna options. For more information about the antennas that are approved for use with the NORA-B2 series, see also the system integration manual [\[1\]](#).

## 1.2 Applications

NORA-B2 series modules provide scalable solutions for a broad range of market segments, including smart cities and buildings, industrial automation, telematics, medical, and healthcare.

Specific application areas include:

- Industrial automation
- Advanced wearables
- Smart buildings and cities
- Low-power sensors
- Wireless-connected and configurable equipment
- Point-of-sale
- Medical and health devices
- Real-time Location, RTLS
- Indoor positioning
- Asset tracking
- Access control

## 1.3 Block diagram

Figure 1 shows the integration of the nRF54Lxx and other logical components in NORA-B2 modules.

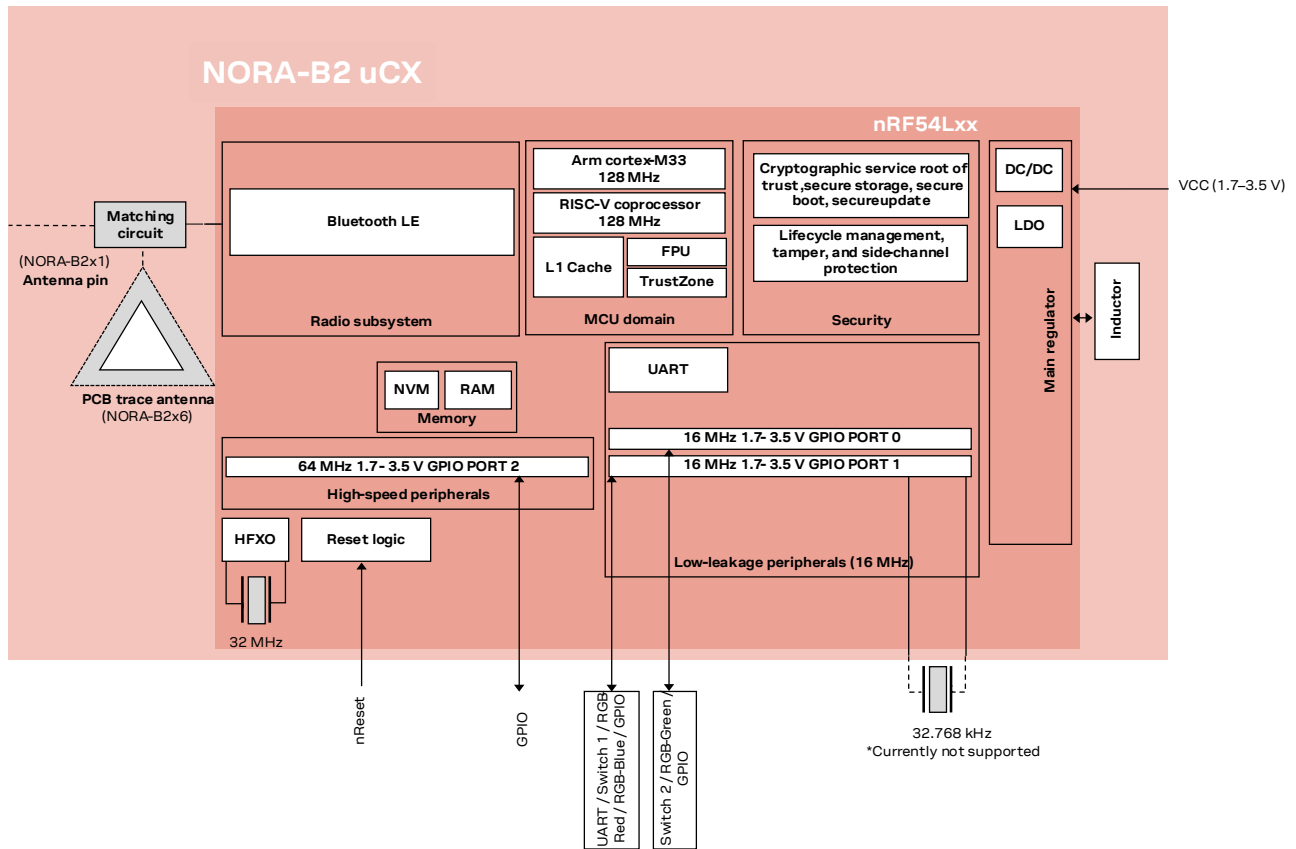


Figure 1: Block diagram of NORA-B2 series

## 1.4 Product variants

The NORA-B2 series modules come with two different antenna options. NORA-B2x1 supports an antenna pin for use with external antennas, while NORA-B2x6 includes an integrated PCB antenna. All product variants are professional grades.

Table 1 describes the main differences between the NORA-B2 various module variants.

| Variants  | CPU      | Antenna   | RAM    | NVM    | Weight [g] | Dimensions [mm]   |
|-----------|----------|-----------|--------|--------|------------|-------------------|
| NORA-B261 | nRF54L10 | Pin       | 192 kB | 1.0 MB | <1         | 11.2 x 10.4 x 1.9 |
| NORA-B266 | nRF54L10 | PCB trace | 192 kB | 1.0 MB | <1         | 14.3 x 10.4 x 1.9 |
| NORA-B276 | nRF54L05 | PCB trace | 96 kB  | 0.5 MB | <1         | 14.3 x 10.4 x 1.9 |

Table 1: NORA-B2 variants exact characteristics summary

## 1.5 Radio performance

Table 2 describes the radio characteristics supported by all NORA-B2 module variants.

| Item                                                                     | NORA-B2                                                                          |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <b>Radio</b>                                                             |                                                                                  |
| Supported 2.4 GHz radio modes                                            | Bluetooth LE tested and verified against Bluetooth Core 6.0                      |
| <b>Bluetooth LE specification</b>                                        |                                                                                  |
| Operating channels and frequencies                                       | 40 channels, channel numbers 0–39, 2402–2480 MHz                                 |
| Bluetooth LE data rates                                                  | 1 Mbps<br>2 Mbps (LE 2M)<br>500 kbps (LE Coded, S=2)<br>125 kbps (LE Coded, S=8) |
| Typical conducted output power                                           | +7.0 dBm                                                                         |
| Radiated output power                                                    | +10 dBm including maximum antenna gain (3 dBi)                                   |
| Conducted RX sensitivity, 1 Mbps                                         | -94 dBm                                                                          |
| Conducted RX sensitivity, 2 Mbps                                         | -91 dBm                                                                          |
| Conducted RX sensitivity, long range, LE Coded 500 kbps (Coded PHY, S=2) | -97 dBm                                                                          |
| Conducted RX sensitivity, long range, LE Coded 125 kbps (Coded PHY, S=8) | -102 dBm                                                                         |

**Table 2: NORA-B2 series common characteristics summary**

## 1.6 u-connectXpress software

NORA-B2 series modules come with the pre-flashed u-connectXpress software with integrated Bluetooth protocol stacks. The modules support Bluetooth LE.

For top-grade security, NORA-B2 modules offer secure boot functionality to ensure that the module boots up only with the original u-connectXpress software.

### 1.6.1 AT command support

NORA-B2 series modules are configured and controlled using high-level AT commands over UART, which eliminates the need for expertise in Bluetooth protocols stacks. For example, users can utilize simple commands to read characteristics from a remote GATT Bluetooth LE service or establish an SPS communication link and perform other functions. See also the u-connectXpress AT commands manual [\[2\]](#).

### 1.6.2 Software update

NORA-B2 u-connectXpress software incorporates a bootloader that facilitates module flashing over the UART interface. The file download process employs the standard XMODEM protocol.

For information about how to upgrade the software, see also the system integration manual [\[1\]](#).

## 1.7 Power save modes

NORA-B2 series modules are designed for power efficiency and operate in low-power mode by default. Additional configuration steps are available to further reduce current consumption as needed.

| Mode                          | Description                                                                                                    | Remarks                                                                                                                                    |
|-------------------------------|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Auto sleep                    | Module automatically handles power save functions.                                                             | All module functions are available.                                                                                                        |
| Auto sleep – with UART RX off | Module automatically handles power save functions. Module receive UART is disabled by the host via AT command. | All module functions are available, but a wake-up signal from the host is required before module can receive AT commands or data via UART. |
| Deep sleep                    | Lowest power consumption. Radio is disabled.                                                                   | The module requires wake up source from host.                                                                                              |

**Table 3: Power save modes**

### 1.7.1 Wake-up sources

NORA-B2 can wake up from any sleep mode using the peripheral sources shown in [Table 4](#).

| Peripheral | Description                                                        | Remarks                                       |
|------------|--------------------------------------------------------------------|-----------------------------------------------|
| GPIO_J9    | Wake up from “deep sleep” or from “auto sleep – with UART RX off”. | Input signal. Active low.                     |
| UART       | Wake up from “deep sleep” or from “auto sleep with UART RX off”.   | Any activity on UART will wake up the module. |

**Table 4: Wake-up sources**

## 2 Interfaces

### 2.1 Power supply

The power for NORA-B2 is supplied through the **VCC** pins with a nominal voltage of 3.3 VDC . This input voltage is also the input/output (I/O) reference for interfacing with external circuitry.

The system power supply circuit must be able to support peak power. The current drawn from **VCC** can vary significantly based on Bluetooth LE power consumption profiles.

NORA-B2 series modules utilize an integrated voltage regulators to transform and stabilize the supply voltage applied to the **VCC** pins. The voltage converter can operate in “linear low drop-out” mode (LDO) or the default “switching power supply” mode.

### 2.2 Low frequency clock

NORA-B2 series modules derive their low frequency clock from the internal RC oscillator (LFRC) which is fully embedded in NORA-B2 and does not require external components

 External Crystal oscillator (LFXO) is currently not supported by the u-connectXpress software.

### 2.3 Module reset

An internal pull-up resistor sets **nRESET** high. To reset (reboot) the module hardware, drive this pin low using an open drain, open collector, or contact switch.

### 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 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 exits bootloader mode and all settings are restored to their factory defaults.

### 2.5 RF antenna interfaces

NORA-B2 uCX data sheet modules support either an internal antenna (NORA-B2x6) or external antennas connected through a dedicated antenna pin (NORA-B2x1).

#### 2.5.1 Internal antenna

NORA-B2x6 modules are supplied with internal PCB trace antennas. Tuned for the 2.4 GHz band specifically and designed for optimal performance in the modules.

For more information about antenna-related design, see also the system integration manual [\[1\]](#).

 The **ANT** signal solder pin is not connected on the NORA-B2x6 module.

#### 2.5.2 External RF antenna interface

The NORA-B2x1 module has an antenna signal (**ANT**) pin with a characteristic impedance of 50  $\Omega$  for use with an external antenna. The antenna signal supports both Tx and Rx.

For the U.FL reference design and the list of approved antennas, see the ) system integration manual [\[1\]](#).

## 2.6 Data interfaces

### 2.6.1 UART

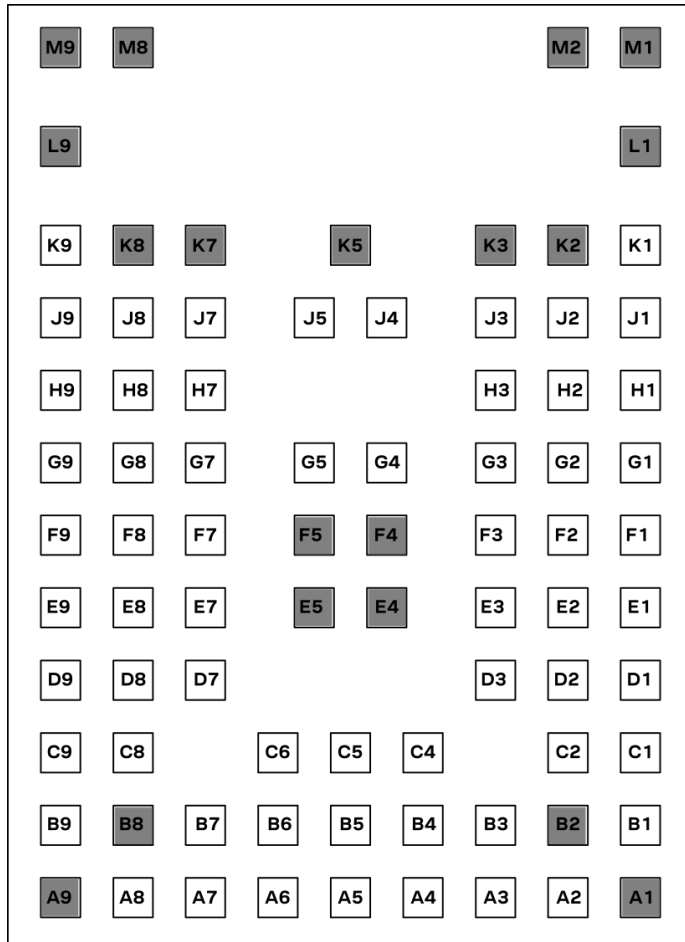
The Universal Asynchronous Receiver Transmitter (UART) is an asynchronous serial interface consisting of up to four signals: transmit data (**UART\_TXD**), receive data (**UART\_RXD**), request-to-send (**UART\_RTS**) handshake, and clear-to-send (**UART\_CTS**) handshake. The handshake signals are optional but are recommended at higher speeds. Default port settings are 115200 bps, 8 data bits, no parity, 1 stop bit. Maximum baud rate is 1 Mbps.

### 3 Pin definition

The following chapters describe the module pin layout and functions.

### 3.1 Pin assignment

Figure 2 describes the pin layout and pin number assignments.



**Figure 2: Pin assignment (top view)**

- ✎ GND pins are shown in gray in [Figure 2](#).
- ✎ Pads L1, L9, M1, M2, M8 and, M9 are only available on NORA-B2x6 variants

## 3.2 Pinout

Table 5 shows the default module pin-out assignments of the NORA-B2 module.

| No. | Name    | Function | Description                                  | Remarks |
|-----|---------|----------|----------------------------------------------|---------|
| A1  | GND     | Ground   | Ground pad                                   |         |
| A2  | n/c     | -        | No connection                                |         |
| A3  | RSVD_A3 | I/O      | Reserved – do not connect                    |         |
| A4  | n/c     | -        | No connection                                |         |
| A5  | DBG_TX  | Output   | Debug UART TX data                           |         |
| A6  | RSVD_A6 | Input    | Reserved – do not connect                    |         |
| A7  | VCC     | Power    | Power supply input and I/O reference voltage |         |

| No. | Name     | Function | Description                                  | Remarks                                            |
|-----|----------|----------|----------------------------------------------|----------------------------------------------------|
| A8  | VCC      | Power    | Power supply input and I/O reference voltage |                                                    |
| A9  | GND      | Ground   | Ground pad                                   |                                                    |
| B1  | RSVD_B1  | Input    | Reserved – do not connect                    |                                                    |
| B2  | GND      | Ground   | Ground pad                                   |                                                    |
| B3  | RSVD_B3  | Output   | Reserved – do not connect                    |                                                    |
| B4  | RSVD_B4  | I/O      | Reserved – do not connect                    |                                                    |
| B5  | NFC2     | I        | NFC antenna connection (not yet supported)   |                                                    |
| B6  | RSVD_B6  | I/O      | Reserved – do not connect                    |                                                    |
| B7  | VCC      | Power    | Power supply input and I/O reference voltage |                                                    |
| B8  | GND      | Ground   | Ground pad                                   |                                                    |
| B9  | n/c      | -        | No connection                                |                                                    |
| C1  | RSVD_C1  | Output   | Reserved – do not connect                    |                                                    |
| C2  | RSVD_C2  | Input    | Reserved – do not connect                    |                                                    |
| C4  | RSVD_C4  | I/O      | Reserved – do not connect                    |                                                    |
| C5  | NFC1     | I        | NFC antenna connection (not yet supported)   |                                                    |
| C6  | RSVD_C6  | I/O      | Reserved – do not connect                    |                                                    |
| C8  | SWITCH_2 | Input    | Switch 2                                     | Internally pulled high, 14 kΩ                      |
| C9  | n/c      | -        | No connection                                |                                                    |
| D1  | RSVD_D1  | I/O      | Reserved – do not connect                    |                                                    |
| D2  | RSVD_D2  | I/O      | Reserved – do not connect                    |                                                    |
| D3  | n/c      | -        | No connection                                |                                                    |
| D7  | n/c      | -        | No connection                                |                                                    |
| D8  | SWITCH_1 | Input    | Switch 1                                     | Internally pulled high, 14 kΩ                      |
| D9  | n/c      | -        | No connection                                |                                                    |
| E1  | RSVD_E1  | I/O      | Reserved – do not connect                    |                                                    |
| E2  | RSVD_E2  | I/O      | Reserved – do not connect                    |                                                    |
| E3  | n/c      | -        | No connection                                |                                                    |
| E4  | GND      | Ground   | Ground pad                                   |                                                    |
| E5  | GND      | Ground   | Ground pad                                   |                                                    |
| E7  | n/c      | -        | No connection                                |                                                    |
| E8  | GPIO_E8  | I/O      | GPIO <sup>1</sup>                            | Output only when configured for WAKE_HOST function |
| E9  | GPIO_E9  | I/O      | GPIO <sup>1</sup>                            |                                                    |
| F1  | RSVD_F1  | I/O      | Reserved – do not connect                    |                                                    |
| F2  | RSVD_F2  | I/O      | Reserved – do not connect                    |                                                    |
| F3  | n/c      | -        | No connection                                |                                                    |
| F4  | GND      | Ground   | Ground pad                                   |                                                    |
| F5  | GND      | Ground   | Ground pad                                   |                                                    |
| F7  | n/c      | -        | No connection                                |                                                    |
| F8  | UART_RTS | Output   | UART_RTS                                     |                                                    |
| F9  | UART_CTS | Input    | UART_CTS                                     |                                                    |
| G1  | n/c      | -        | No connection                                |                                                    |
| G2  | n/c      | -        | No connection                                |                                                    |
| G3  | n/c      | -        | No connection                                |                                                    |

<sup>1</sup> GPIO and WAKE\_HOST not yet supported

| No.                                   | Name     | Function | Description                                              | Remarks                                             |
|---------------------------------------|----------|----------|----------------------------------------------------------|-----------------------------------------------------|
| G4                                    | n/c      | -        | No connection                                            |                                                     |
| G5                                    | RSVD_G5  | I/O      | Reserved – do not connect                                |                                                     |
| G7                                    | RSVD_G7  | I/O      | Reserved – do not connect                                |                                                     |
| G8                                    | UART_TXD | Output   | UART_TXD                                                 |                                                     |
| G9                                    | UART_RXD | Input    | 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    | Output   | Green LED                                                | Active low                                          |
| H9                                    | BLUE     | Output   | Blue LED                                                 | Active low                                          |
| J1                                    | n/c      | -        | No connection                                            |                                                     |
| J2                                    | RSVD_J2  | Output   | Reserved – do not connect                                |                                                     |
| J3                                    | nRESET   | Input    | External system reset input                              | Internally pulled high, 14 kΩ                       |
| J4                                    | n/c      | -        | No connection                                            |                                                     |
| J5                                    | n/c      | -        | No connection                                            |                                                     |
| J7                                    | n/c      | -        | No connection                                            |                                                     |
| J8                                    | RED      | Output   | Red LED                                                  | Active low                                          |
| J9                                    | GPIO_J9  | I/O      | WAKE_UP from sleep                                       | Input only when configured as WAKE_UP (see Table 4) |
| K1                                    | n/c      | -        | No connection                                            |                                                     |
| K2,<br>K3,<br>K5,<br>K7,<br>K8        | GND      | Ground   | Ground pad                                               |                                                     |
| K9                                    | ANT      | Antenna  | NORA-B2x1: Antenna interface<br>NORA-B2x6: No connection | 50 Ω nominal characteristic impedance               |
| L1,<br>L9,<br>M1,<br>M2,<br>M8,<br>M9 | GND      | Ground   | Ground pad                                               | Only available on NORA-B2x6                         |

**Table 5: NORA-B2 pinout**

## 4 Electrical specifications

Stressing the device above one or more of the [absolute maximum ratings](#) can 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 may affect device reliability.

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

### 4.1 Absolute maximum ratings

| Signal              | Description                             | Condition                         | Min  | Max       | Unit |
|---------------------|-----------------------------------------|-----------------------------------|------|-----------|------|
| VCC                 | Module supply high voltage              | Input DC voltage at VCC pin       | -0.3 | 3.8       | V    |
| V <sub>I/O</sub>    | Input DC voltage at any digital I/O pin | VCC ≤ 3.5 V                       | -0.3 | VCC + 0.3 | V    |
|                     |                                         | VCC > 3.5 V                       | -0.3 | 3.8       | V    |
| P_ANT               | Maximum power at the receiver           | Input RF power at the antenna pin |      | 0         | dBm  |
| I <sub>NFC1/2</sub> | NFC Antenna pin current                 | Input current at NFC pin          |      | 130       | mA   |

**Table 6: Absolute maximum ratings**

The product is not protected against overvoltage or reversed voltages. Use appropriate protection devices to ensure that voltage spikes exceeding the power supply voltage specifications in [Table 6](#) are kept within the specified limits.

#### 4.1.1 Maximum ESD ratings

| Parameter                                   | Min | Typical | Max | Unit | Remarks                                                                                                                       |
|---------------------------------------------|-----|---------|-----|------|-------------------------------------------------------------------------------------------------------------------------------|
| ESD sensitivity for all pins except ANT pin |     |         | 1   | kV   | Determined according to JEDEC Standard JESD22-A114, Electrostatic Discharge (ESD) Sensitivity Testing Human Body Model (HBM). |
| ESD sensitivity for all pins except ANT pin |     |         | 500 | V    | Charged device model according to JESD22-C101                                                                                 |
| ESD indirect contact discharge              |     |         | ±8* | kV   | According to EN 301 489-1                                                                                                     |

\*Tested on EVK-NORA-B20 evaluation board

**Table 7: Maximum ESD ratings**

NORA-B2 uCX data sheet modules are Electrostatic Sensitive Devices and require special precautions while handling. For ESD handling instructions, refer to also [ESD precautions](#).

#### 4.1.2 Non-volatile memory endurance

| Parameter | Value  | Unit                 |
|-----------|--------|----------------------|
| Endurance | 10,000 | Write/rewrite cycles |
| Retention | 10     | Years at 85 °C       |

**Table 8: NVM endurance**

## 4.2 Recommended operating conditions

Unless otherwise specified, all given specifications have been measured at an ambient temperature of 25 °C with a supply voltage of 3.3 V.

Operation beyond the specified operating conditions is not recommended and extended exposure beyond them may affect device reliability.

## 4.2.1 Operating and storage temperature range

| Parameter             | Min | Typ | Max  | Unit |
|-----------------------|-----|-----|------|------|
| Storage temperature   | -40 |     | +105 | °C   |
| Operating temperature | -40 | +25 | +85  | °C   |

Table 9: Temperature range

## 4.2.2 Supply/power pin

| Symbol             | Parameter                                | Min  | Typ | Max | Unit |
|--------------------|------------------------------------------|------|-----|-----|------|
| VCC                | NORA-B2 module supply voltage            | 1.7  | -   | 3.5 | V    |
| VCC <sub>POR</sub> | VCC supply voltage during power-on reset | 1.75 | -   | -   | V    |

Table 10: Input characteristics of voltage supply pins

## 4.2.3 RESET\_N pin



See Table 10 for the requirement for VCC supply voltage during power-on reset (VCC<sub>POR</sub>).

| Pin name | Parameter                                                                                                                      | Min | Typ | Max | Unit |
|----------|--------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| RESET_N  | Time measured as time in power-on reset after supply reaches minimum operating voltage, with VCC rise time from 1 µs to 100 ms |     | 0.2 | 2   | ms   |

Table 11: RESET\_N pin characteristics

## 4.2.4 Digital pins

| Condition                                                        | Min       | Typ | Max       | Unit |
|------------------------------------------------------------------|-----------|-----|-----------|------|
| Input high voltage                                               | 0.7 x VCC |     | VCC       | V    |
| Input low voltage                                                | GND       |     | 0.3 x VCC | V    |
| Output high voltage, standard drive, 0.5 mA, VCC ≥ 1.7           | VCC-0.4   |     | VCC       | V    |
| Output high voltage, high drive, 5 mA, VCC ≥ 2.7 V               | VCC-0.4   |     | VCC       | V    |
| Output high voltage, high drive, 3 mA, VCC ≥ 1.7 V               | VCC-0.4   |     | VCC       | V    |
| Output low voltage, standard drive, 0.5 mA, VCC ≥ 1.7            | GND       |     | GND+0.4   | V    |
| Current at GND+0.4 V, output set low, standard drive, VCC ≥ 1.7  | 1         | 3   | 4         | mA   |
| Current at GND+0.4 V, output set low, high drive, VCC ≥ 1.7 V    | 3         |     |           | mA   |
| Current at GND+0.4 V, output set low, extra drive, VCC ≥ 1.7 V   | 16        |     |           | mA   |
| Current at VCC-0.4 V, output set high, standard drive, VCC ≥ 1.7 | 1         | 3   | 4         | mA   |
| Current at VCC-0.4 V, output set high, high drive, VCC ≥ 1.7 V   | 4         |     |           | mA   |
| Current at VCC-0.4 V, output set high, extra drive, VCC ≥ 1.7 V  | 14        |     |           | mA   |
| Recommended maximum sustained current drawn by all GPIOs         |           |     | 15        | mA   |
| Rise/Fall time, high drive mode, 20-80%, 12 pF load              |           | 4   |           | ns   |
| Rise/Fall time, extra drive mode, 20-80%, 12 pF load             |           | 0.9 |           | ns   |
| Pull-up resistance                                               | 12        | 14  | 16        | kΩ   |
| Pull-down resistance                                             | 12        | 14  | 18        | kΩ   |

Table 12: Digital pin characteristics

## 4.2.5 Current consumption

The typical current consumption of a NORA-B26 module is shown in Table 13. The current consumption is highly dependent on the application implementation. Measurements are taken at

- 115200 baud rate
- 40 ms connection interval

- 1 second advertising interval
- UART RX On unless otherwise stated
- 25 °C
- a 3.3 V supply
- using u-connectXpress v3.0.0 (or later)

| Radio mode   | Role       | Activity                                  |              | Consumption | Unit |
|--------------|------------|-------------------------------------------|--------------|-------------|------|
| Off          |            | System Idle                               | Avg. current | 141         | µA   |
| Off          |            | UART RX Off                               | Avg. current | 7           | µA   |
| Off          |            | CPU in deep sleep                         | Avg. current | 1           | µA   |
| Bluetooth LE | Central    | Bluetooth idle                            | Avg. current | 141         | µA   |
|              |            | Bluetooth scan                            | Avg. current | 2.53        | mA   |
|              |            | Bluetooth connected (idle)                | Avg. current | 191         | µA   |
|              | Peripheral | Bluetooth idle                            | Avg. current | 141         | µA   |
|              |            | Bluetooth advertising                     | Avg. current | 147         | µA   |
|              |            | Bluetooth advertising, <i>UART RX off</i> | Avg current  | 21          | uA   |
|              |            | Bluetooth connected (idle)                | Avg. current | 208         | µA   |

**Table 13: Typical current consumption**

## 4.2.6 Throughput performance

The throughput shown in [Table 14](#) was measured in a conducted setup using u-connectXpress version 3.0.0. For descriptions of the different transfer modes, see the system integration manual [\[1\]](#).

| Radio mode          | Transfer mode | Direction | Baud rate | Connection Interval | Throughput | Protocol | Remarks               |
|---------------------|---------------|-----------|-----------|---------------------|------------|----------|-----------------------|
| Bluetooth Coded PHY | Transparent   | UL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
|                     | Transparent   | DL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
|                     | AT            | UL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
|                     | AT (direct)   | DL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
|                     | AT (buffered) | DL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
| Bluetooth LE1M PHY  | Transparent   | UL        | 1 Mbps    | 12.5 ms             | 410 kbps   | SPS      | Central or peripheral |
|                     | Transparent   | DL        | 1 Mbps    | 12.5 ms             | 410 kbps   | SPS      | Central or peripheral |
|                     | AT            | UL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
|                     | AT (direct)   | DL        | 1 Mbps    | 20 ms               | 419 kbps   | SPS      | Central or peripheral |
|                     | AT (buffered) | DL        | 1 Mbps    | 12.5 ms             | 482 kbps   | SPS      | Central or peripheral |
| Bluetooth LE2M PHY  | Transparent   | UL        | 1 Mbps    | 20 ms               | 608 kbps   | SPS      | Central or peripheral |
|                     | Transparent   | DL        | 1 Mbps    | 20 ms               | 608 kbps   | SPS      | Central or peripheral |
|                     | AT            | UL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
|                     | AT (direct)   | DL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |
|                     | AT (buffered) | DL        | 1 Mbps    | -                   | - kbps     | SPS      | Central or peripheral |

**Table 14: Throughput performance**

## 4.2.7 RF performance

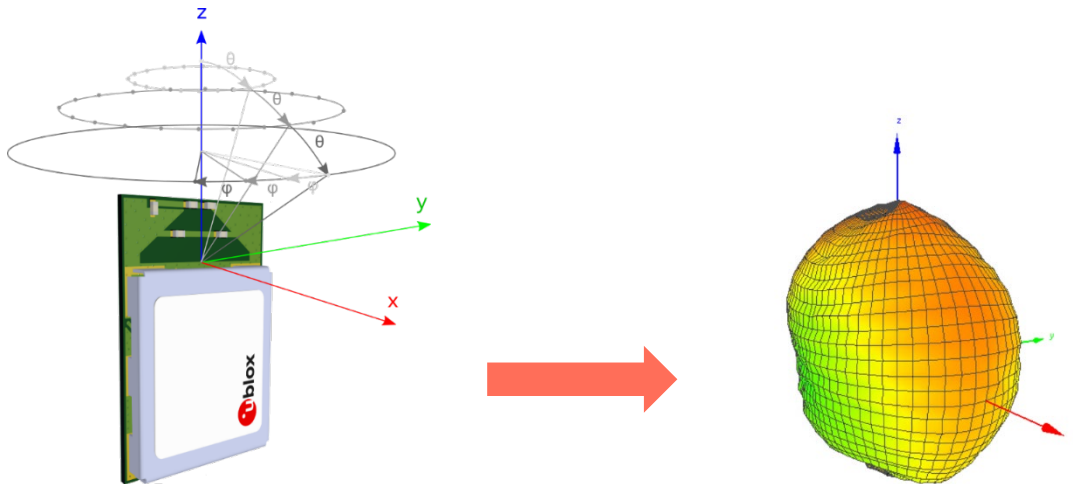
| Parameter                   | Test condition                                   | Min | Typ  | Max | Unit |
|-----------------------------|--------------------------------------------------|-----|------|-----|------|
| <b>Bluetooth LE mode</b>    |                                                  |     |      |     |      |
| Receiver input sensitivity* | Conducted at 25 °C, 1 Mbit/s Bluetooth LE mode   |     | -94  |     | dBm  |
|                             | Conducted at 25 °C, 2 Mbit/s Bluetooth LE mode   |     | -91  |     | dBm  |
|                             | Conducted at 25 °C, 500 kbit/s Bluetooth LE mode |     | -97  |     | dBm  |
|                             | Conducted at 25 °C, 125 kbit/s Bluetooth LE mode |     | -102 |     | dBm  |
| Maximum output power        | Conducted at 25 °C                               |     | +7   |     | dBm  |
| <b>Antenna</b>              |                                                  |     |      |     |      |
| NORA-B2x6 antenna gain      | Internal to EVK-NORA-B2x6                        |     | +3   |     | dBi  |

\*Conducted test on EVK-NORA-B201 evaluation board.

**Table 15: NORA-B2 RF performance**

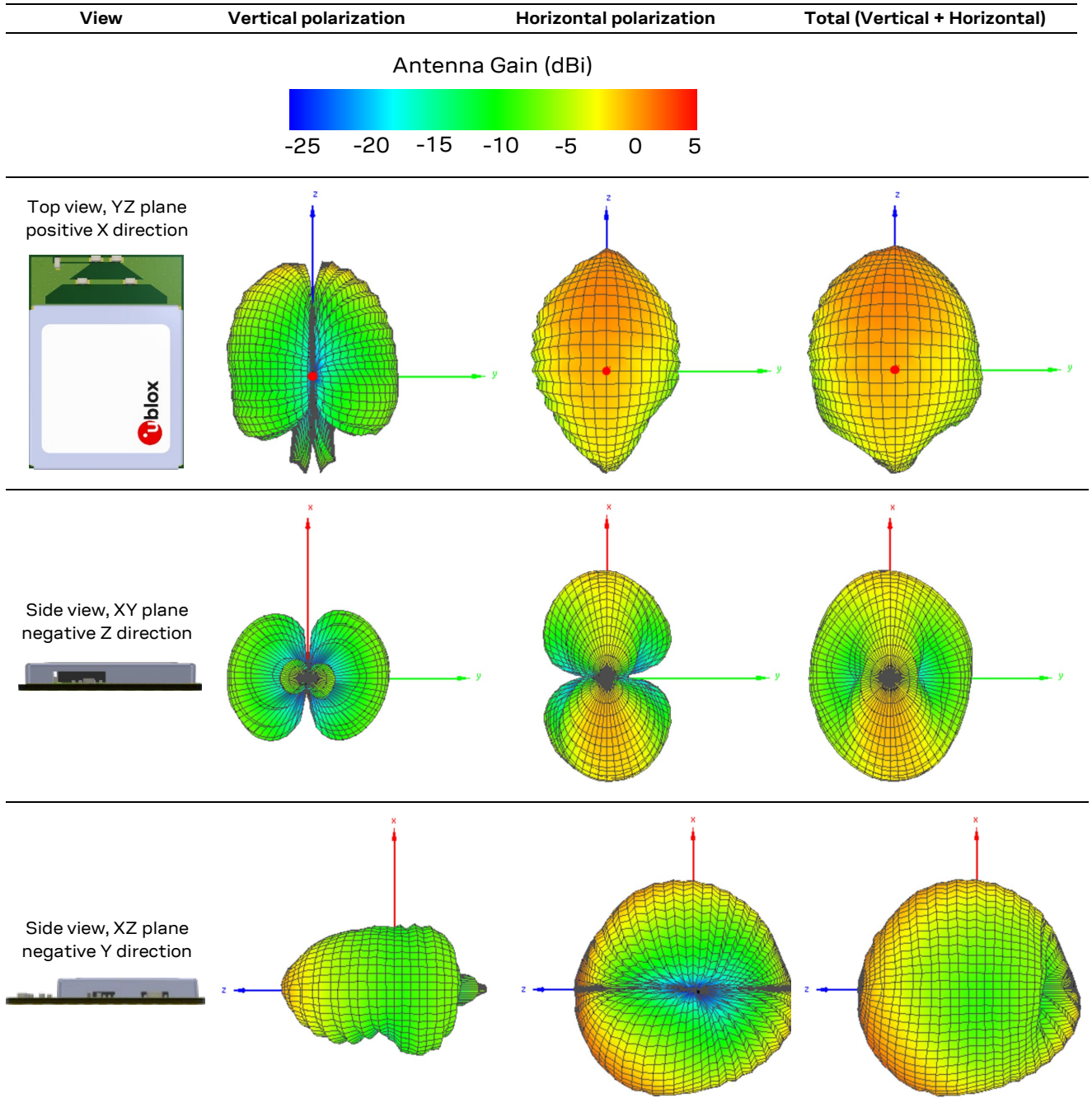
## 4.2.8 Antenna radiation patterns

Figure 3 provides an overview of the measurement procedure and describes how the NORA-B2x6 module is aligned to the XYZ-coordinate system. A measurement is taken at every dotted position above the module image (shown left). Each measurement is represented as a grid point in the radiation pattern (shown right).



**Figure 3: Spherical test points**

Table 16 shows the displayed radiation patterns of the internal PCB trace antenna on NORA-B2x6.



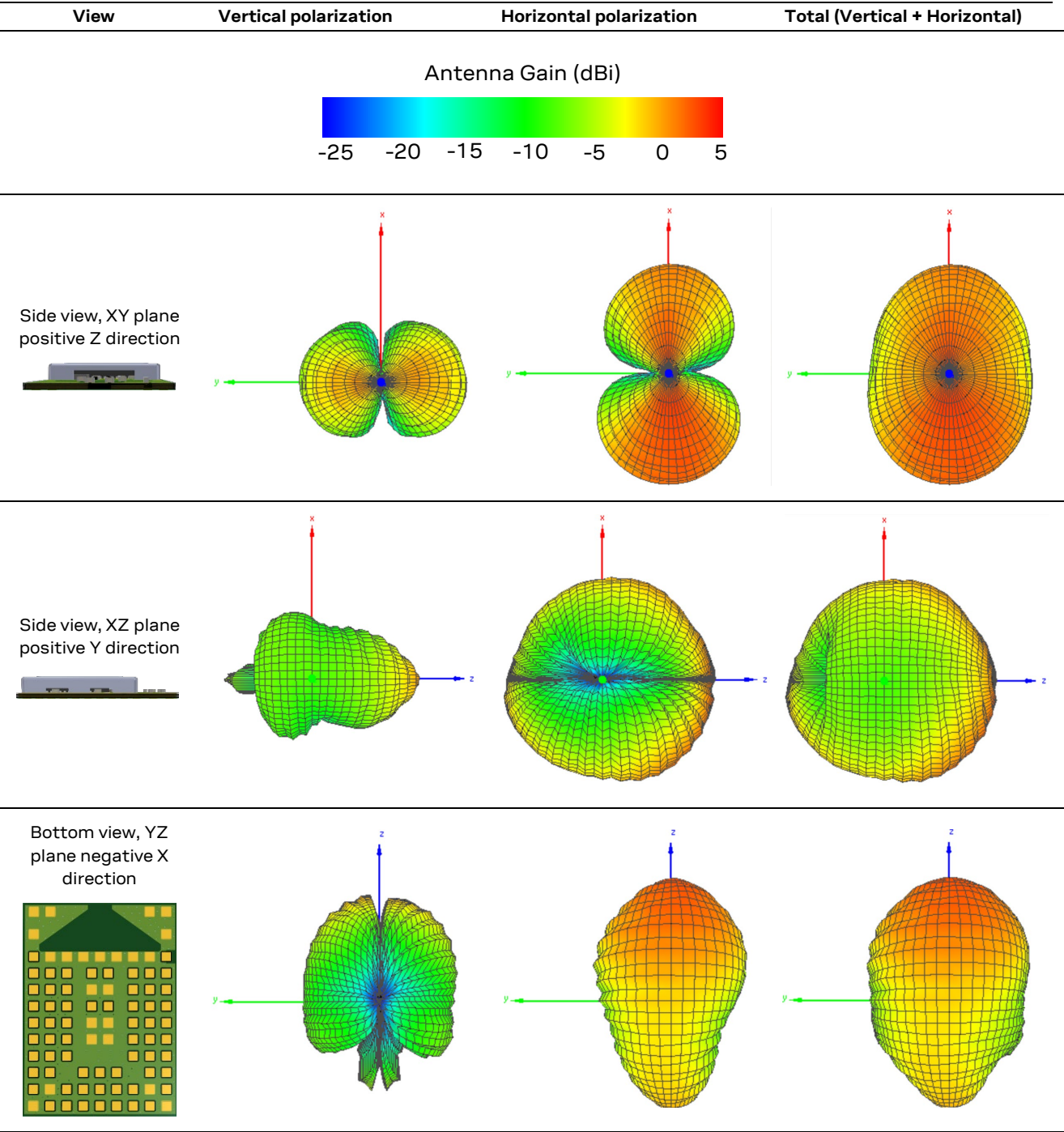
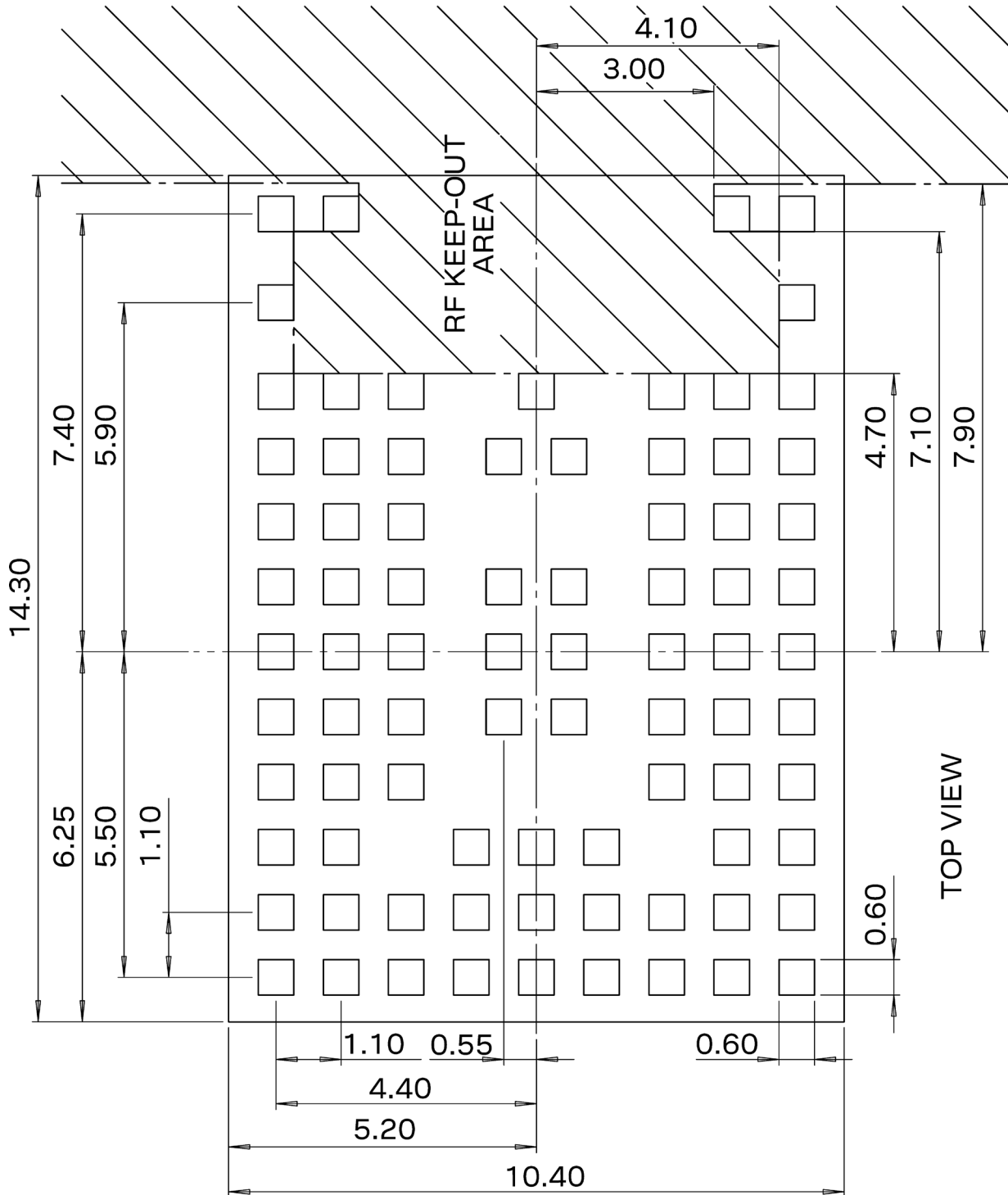


Table 16: NORA-B2x6 antenna radiation patterns

## 5 Mechanical specifications

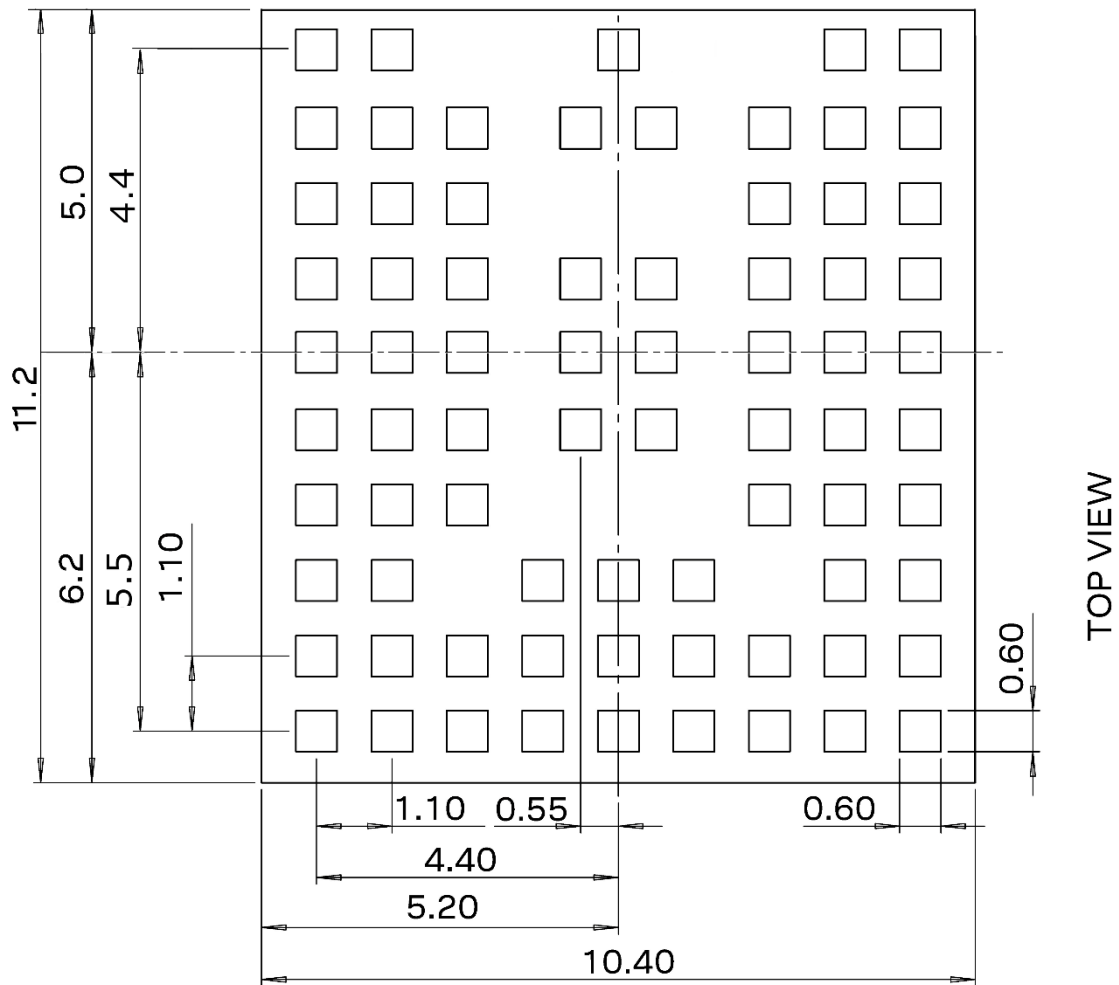
### 5.1 NORA-B2 footprint dimensions

Figure 4 shows the common footprint and dimensions of NORA-B2x6 modules, while Figure 5 shows the common footprint and dimensions of NORA-B2x1 modules. Nominal values are used.



All dimensions in mm.

**Figure 4: NORA-B2x6 footprint dimensions**



All dimensions in mm.

**Figure 5: NORA-B2x1 footprint dimensions**

## 5.2 NORA-B2 mechanical specification

### 5.2.1 NORA-B2x6 mechanical specifications

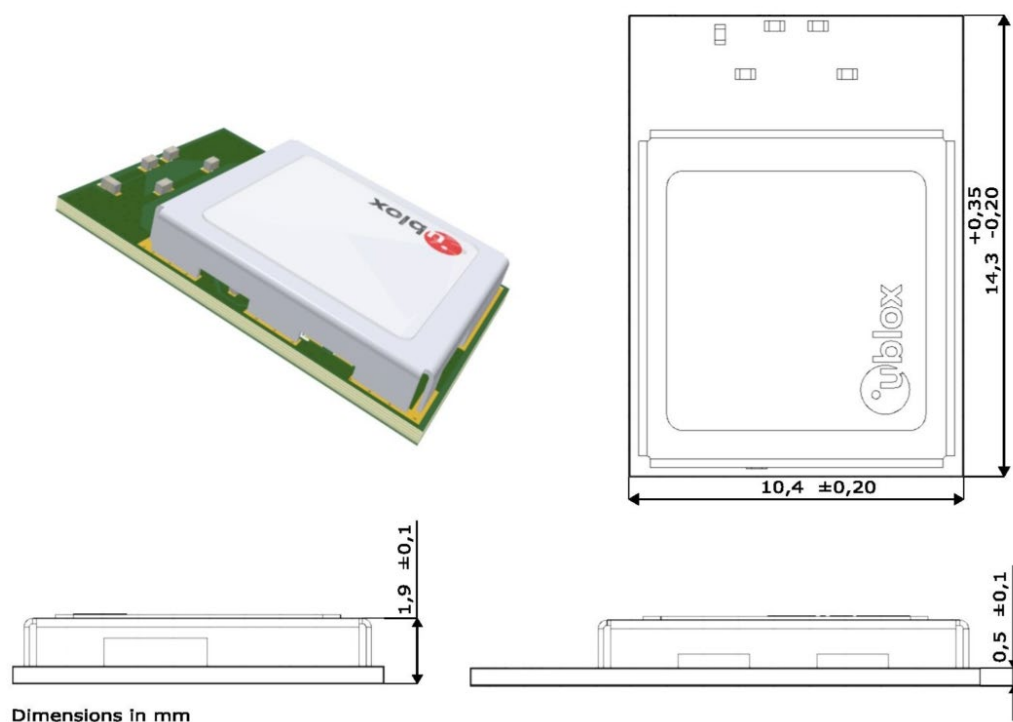


Figure 6: NORA-B2x6 mechanical specification

### 5.2.2 NORA-B2x1 mechanical specification

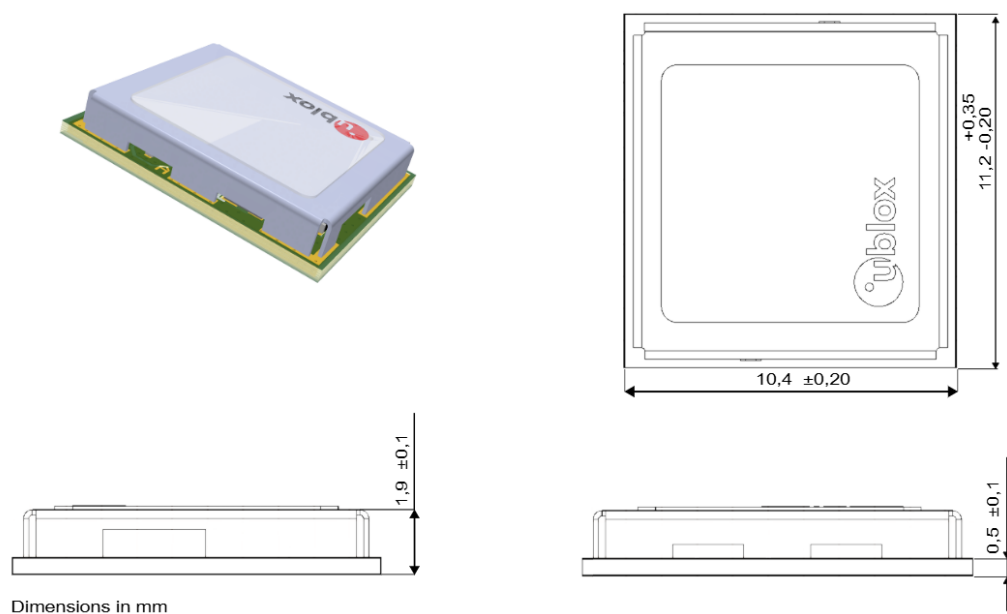


Figure 7: NORA-B2x1 mechanical specification

## 6 Qualifications and approvals

### 6.1 Country approvals

NORA-B2 modules are certified for use in the following countries/regions:

| Country/region       | NORA-B2x1 | NORA-B2x6 |
|----------------------|-----------|-----------|
| Europe               | Approved  | Approved  |
| Great Britain (UKCA) | Approved  | Approved  |
| USA                  | Approved  | Approved  |
| Canada               | Approved  | Approved  |
| Japan                | Approved  | Approved  |
| South Korea          | Approved  | Approved  |
| Australia            | Approved  | Approved  |
| New Zealand          | Approved  | Approved  |
| Taiwan               | Approved  | Approved  |

**Table 17: Country approvals**

 For detailed information about the regulatory requirements that must be met for all end-product applications based on NORA-B2 modules, refer to the system integration manual [\[1\]](#).

### 6.2 Bluetooth qualification



All products that use Bluetooth technology must be qualified with the Bluetooth Special Interest Group (SIG). This is also applicable for products that are using an already Bluetooth-qualified module.

Product declarations are submitted through the SIG [Bluetooth SIG Qualification Workspace](#).

The NORA-B2 series modules are qualified as a Core-Controller Configuration against Bluetooth core 6.0.

To list your product that integrates NORA-B2 with no additional testing required, combine the DN (Device Number) for the Bluetooth stack implemented in the Core-Host Configuration with the DN of the Core-Controller Configuration shown in [Table 18](#).

| Product name                    | Product type                  | DN                      | Product qualification date |
|---------------------------------|-------------------------------|-------------------------|----------------------------|
| NORA-B261, NORA-B266, NORA-B276 | Core-Controller Configuration | <a href="#">Q364310</a> | 2025-08-05                 |

**Table 18: NORA-B2 series Bluetooth Design Number**

## 7 Product handling

### 7.1 Packaging

NORA-B2 uCX data sheet modules are delivered as hermetically sealed, reeled tapes to enable efficient production, production lot set-up and tear-down. For more information about packaging, refer to also the Packaging information reference guide [3].

#### 7.1.1 Reels

NORA-B2 uCX data sheet modules are deliverable in quantities of 500 pieces on a reel. The reel types for the modules are shown in Table 19.

For more detailed information, see also the Packaging information reference guide [3].

| Model     | Reel type |
|-----------|-----------|
| NORA-B261 | A3        |
| NORA-B266 | A3        |
| NORA-B276 | A3        |

Table 19: Reel types for different models of the NORA-B2 uCX data sheet

#### 7.1.2 Tapes

Figure 8 and Figure 9 shows the position and orientation of the NORA-B2 uCX data sheet modules as they are delivered on tape. The dimensions of the tapes are specified in Figure 10 and Figure 11.

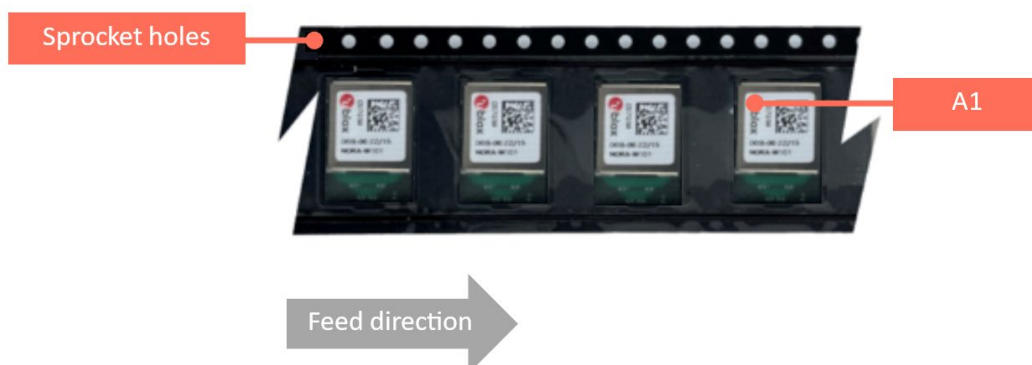


Figure 8: Orientation of NORA-B2x6 module on tape

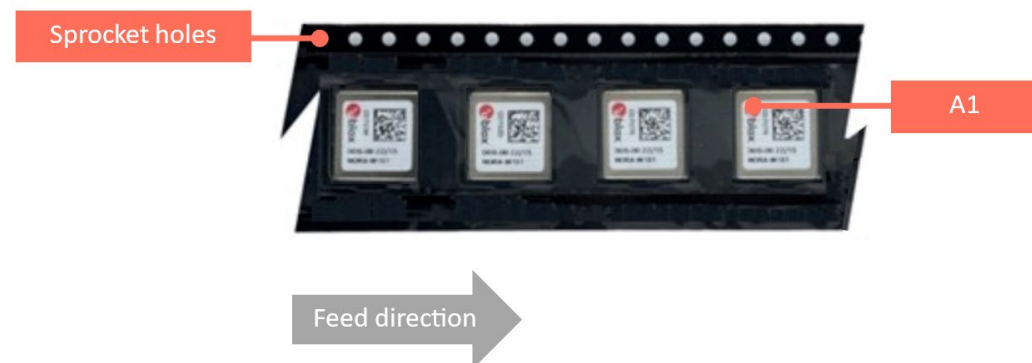
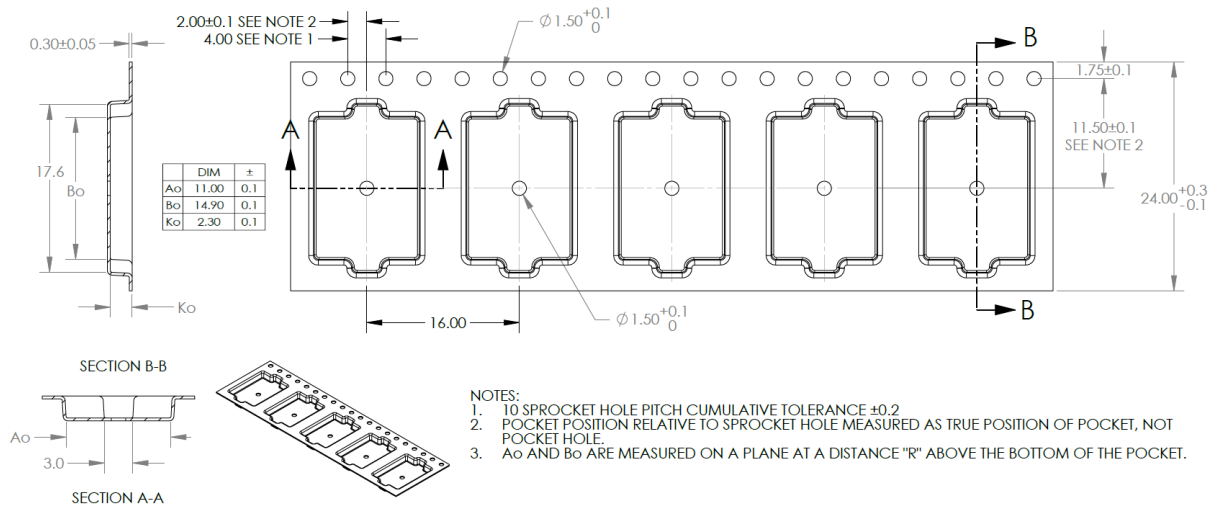


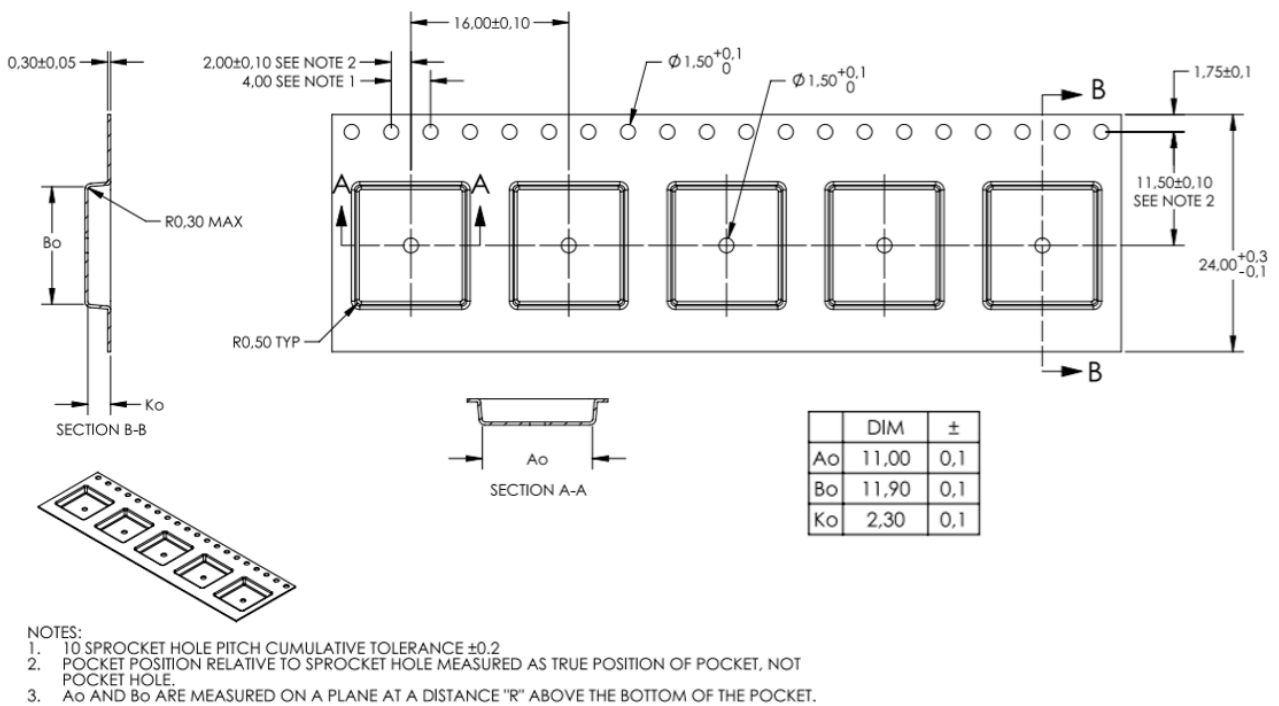
Figure 9: Orientation of NORA-B2x1 module on tape

Figure 10 shows the tape and pocket dimensions for NORA-B2x6.



**Figure 10: Tape and pocket dimensions for NORA-B2x6**

Figure 11 shows the tape and pocket dimensions for NORA-B2x1



**Figure 11: Tape and pocket dimensions for NORA-B2x1**

## Moisture sensitivity levels

NORA-B2 uCX data sheet modules are classified as Moisture Sensitive Devices (MSD) in accordance with the IPC/JEDEC specification.

The Moisture Sensitivity Level (MSL) relates to the required packaging and handling precautions.

-  NORA-B2 series modules are rated at **MSL level 4** in accordance with the IPC/JEDEC J-STD-020 standard. For detailed information, see the moisture sensitive warning label on the MBB (Moisture Barrier Bag).

After opening the dry pack, the modules must be mounted within 72 hours in factory conditions of maximum 30 °C/60%RH or must be stored at less than 10% RH. The modules require baking if the humidity indicator card shows more than 10% when read at 23±5 °C or if the conditions mentioned above are not met. For information about the bake procedure, see also the J-STD-033B standard.

For more information regarding moisture sensitivity levels, labeling and storage, see the Packaging information reference guide [\[3\]](#).

-  For MSL standards, see also IPC/JEDEC J-STD-020 and IPC/JEDEC J-STD-033B. The standards can be downloaded from the JEDEC website [\[5\]](#).

## 7.3 Reflow soldering

Reflow profiles are selected according to u-blox recommendations. See the system integration manual [\[1\]](#) for more information.

-  Failure to follow these recommendations can result in severe damage to the device.

## 7.4 ESD precautions

-  NORA-B2 uCX data sheet modules contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD). Handling the NORA-B2 uCX data sheet modules without proper ESD protection may destroy or damage them permanently.

NORA-B2 uCX data sheet modules are electrostatic sensitive devices (ESD) and require special ESD precautions typically applied to the 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-B2 uCX data sheet module. Failure to observe these recommendations can result in severe damage to the device.

## 8 Labeling and ordering information

The labels on NORA-B2 series modules include important product information.

### 8.1 Module marking

Figure 12 shows the label applied to NORA-B2 series modules. Each of the label references given is described in Table 20.

All units in mm unless specified otherwise.

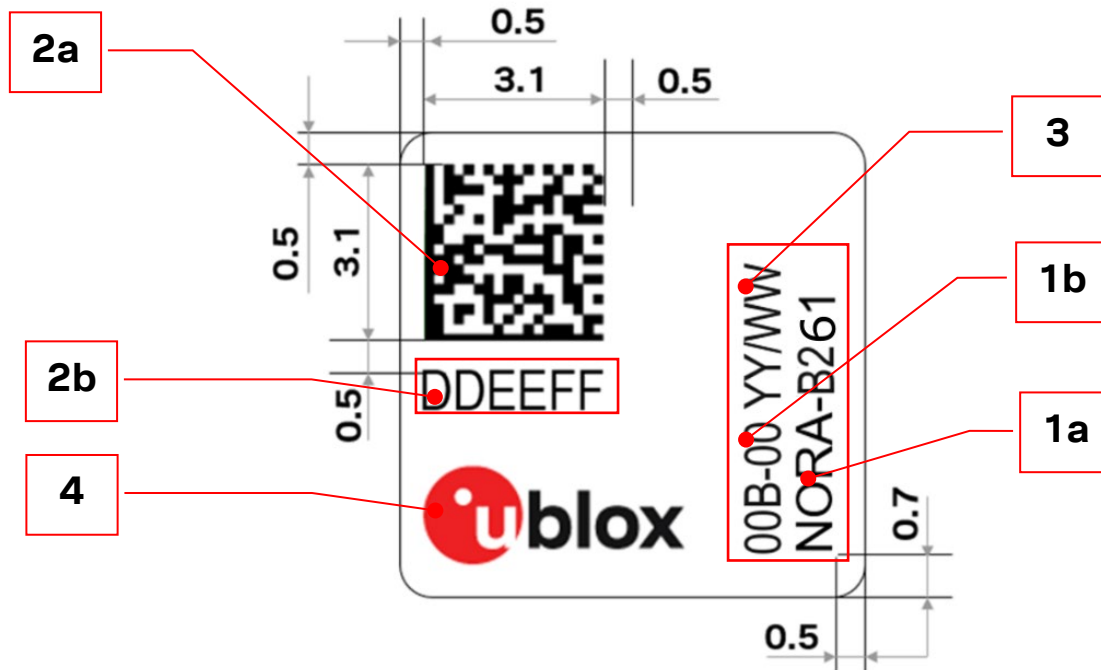


Figure 12: NORA-B2 uCX data sheet module marking

| Reference | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1a        | Text box containing Product Name and approval ID:s (Applicable model names: NORA-B2xx).                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1b        | Product type number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 2a        | Data Matrix with unique serial number comprising 19 alphanumeric digits: (product identifier, serial number, datacode) <ul style="list-style-type: none"> <li>Product identifier: 3 digits, used for production tracking and are an abbreviated representation of the Type number that is unique to each module variant</li> <li>Serial number: 12 digits, Unique MAC address assigned during module production.</li> <li>Datacode: 4 digits, Represent the hardware and firmware version encoded.</li> </ul> |
| 2b        | The six last hex symbols of the MAC address (AABBCCDDEEFF).                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3         | Date of production encoded YY/WW (year/week).                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4         | u-blox logo. The red dot also indicates pin 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 20: NORA-B2 uCX data sheet module marking

## 8.2 Product identifiers

Table 21 describes the three product identifiers, namely the Type number, Model name and Ordering code.

| Format        | Description                                                                                                                                                                                                 | Nomenclature     |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Model name    | Describes the form factor, platform technology and platform variant. Used mostly in product documentation like this data sheet, the model name represents the most common identity for all u-blox products. | PPPP-TGVV        |
| Ordering code | Comprises the model name – with additional identifiers to describe the major product version and quality grade.                                                                                             | PPPP-TGVV-TTQ    |
| Type number   | Comprises the model name and ordering code – with additional identifiers to describe minor product versions.                                                                                                | PPPP-TGVV-TTQ-XX |

Table 21: Product code formats

## 8.3 Identification codes

Table 22 explains the parts of the product code.

| Code | Meaning                                                                                                                | Example                                        |
|------|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| PPPP | Form factor                                                                                                            | NORA                                           |
| TG   | Platform (Technology and Generation)<br>T – Dominant technology, for example, W: Wi-Fi, B: Bluetooth<br>G – Generation | B2: Bluetooth Generation 2 of NORA form factor |
| VV   | Variant based on the same platform; range [00...99]                                                                    | 01: default configuration, with antenna pin    |
| TT   | Major product version                                                                                                  | 00: first revision                             |
| Q    | Quality grade<br>A: Automotive<br>B: Professional<br>C: Standard                                                       | B: professional grade                          |
| XX   | Minor product version (not relevant for certification)                                                                 | Default value is 00                            |

Table 22: Part identification code

## 8.4 Ordering information

| Ordering Code | Product                                                                             |
|---------------|-------------------------------------------------------------------------------------|
| NORA-B261-00B | NORA-B2 module with antenna pin, based on nRF54L10, u-connectXpress v3.0.1          |
| NORA-B266-00B | NORA-B2 module with internal PCB antenna, based on nRF54L10, u-connectXpress v3.0.1 |
| NORA-B276-00B | NORA-B2 module with internal PCB antenna, based on nRF54L05, u-connectXpress v3.2.0 |

Table 23: Product ordering codes

# Appendix

## A Glossary

| Abbreviation | Definition                                                       |
|--------------|------------------------------------------------------------------|
| ADC          | Analog to Digital Converter                                      |
| AoA          | Angle of Arrival                                                 |
| AoD          | Angle of Departure                                               |
| BPF          | Band Pass Filter                                                 |
| CBC-MAC      | Cipher block chaining - message authentication code              |
| CCM          | Counter with cipher block chaining - message authentication code |
| CMAC         | Cipher-based Message Authentication Code                         |
| CPU          | Central Processing Unit                                          |
| CTI          | Cross Trigger Interface                                          |
| CTR          | AES CCM combines counter                                         |
| CTS          | Clear To Send                                                    |
| DC           | Direct Current                                                   |
| DMA          | Direct Memory Access                                             |
| DPPI         | Distributed Programmable Peripheral Interconnect                 |
| DWT          | Data Watchpoint and Trace                                        |
| ECB          | Electronic CodeBook                                              |
| EDM          | Extended Data Mode                                               |
| ESD          | ElectroStatic Discharge                                          |
| ETM          | Embedded Trace Macrocell                                         |
| FCC          | Federal Communications Commission (United States)                |
| FEM          | Front End Module                                                 |
| FLPR         | Fast Lightweight Peripheral Processor                            |
| FPU          | Floating Point Unit                                              |
| GATT         | Generic ATtribute profile                                        |
| GCM          | Galois/Counter Mode                                              |
| GPIO         | General Purpose Input/Output                                     |
| I2C          | Inter-Integrated Circuit                                         |
| ISED         | Innovation, Science and Economic Development (Canada)            |
| IEEE         | Institute of Electrical and Electronics Engineers                |
| IPC          | Inter-Processor Communication                                    |
| ITM          | Instrumentation Trace Macrocell                                  |
| LE           | Low Energy                                                       |
| LNA          | Low Noise Amplifier                                              |
| MUTEX        | Mutually Exclusive                                               |
| NFC          | Near Field Communication                                         |
| OEM          | Original Equipment Manufacturer                                  |
| OTP          | One-Time Programmable                                            |
| OUI          | Organizationally Unique Identifier                               |
| PA           | Power Amplifier                                                  |
| PDM          | Pulse Density Modulation                                         |
| PWM          | Pulse Width Modulation                                           |

| Abbreviation | Definition                                  |
|--------------|---------------------------------------------|
| QDEC         | Quadrature DECoder                          |
| QSPI         | Quad Serial Peripheral Interface            |
| RAM          | Random Access Memory                        |
| RNG          | Random Number Generator                     |
| GRTC         | Global Real-Time Counter                    |
| RTLS         | Real-Time Location Service                  |
| RTS          | Request To Send                             |
| SDK          | Software Development Kit                    |
| SPI          | Serial Peripheral Interface                 |
| SWD          | Serial Wire Debug                           |
| TWI          | Two-Wire Interface (See I2C)                |
| UART         | Universal Asynchronous Receiver/Transmitter |
| UICR         | User Information Control Registers          |
| WDT          | WatchDog Timer                              |
| XIP          | eXecute In Place                            |

**Table 24: Explanation of the abbreviations and terms used**

## Related documents

- [1] NORA-B2 (u-connectXpress) system integration manual, [UBXDOC-465451970-2534](#)
- [2] NORA-B26 AT Command Manual,  
NORA-B27 AT Command Manual and User Guides: <https://github.com/u-blox/u-connectXpress>
- [3] Packaging information reference guide, [UBX-14001652](#)
- [4] Nordic Semiconductor [nRF54L15\\_nRF54L10\\_nRF54L05 Datasheet](#)
- [5] JEDEC [website](#)

 For product change notifications and regular updates of u-blox documentation, register on our website, [www.u-blox.com](http://www.u-blox.com).

## Revision history

| Revision | Date        | Name          | Comments                                                                                                                                                                                                                                                                                                           |
|----------|-------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R01      | 19-Aug-2025 | habd          | Initial release                                                                                                                                                                                                                                                                                                    |
| R02      | 01-Okt-2025 | habd,<br>fkru | Updates according to the Nordic datasheet v.10:<br><a href="#">Absolute maximum ratings</a> VCC (Max), Added VCC supply voltage needed during power-on reset in <a href="#">Table 10</a> . Updates to <a href="#">Country approvals</a> .<br>Minor updates and documentation improvements throughout the document. |
| R03      | 8-Dec-2025  | whsu          | Added variant NORA-B27. Minor documentation improvements throughout the document.                                                                                                                                                                                                                                  |
| R04      | 6-Feb-2026  | mape          | Added use case in <a href="#">Current consumption</a> .<br>Updated links to AT manual and user guides.<br>Updated NORA-B27 status to Initial Production.                                                                                                                                                           |

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