
QD302E

Instructions

Applies For
QD302E Module



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REVISION HISTORY

Revision	Modification	Date
Firmware 1.1.6	New Release	2025/07/17

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1. Overview

The QD302E is a built-in LORA transceiver radio specifically developed for the lawn mower market and IoT wireless transmission application scenarios. The product supports the 868MHz and 915MHz ISM license-free frequency bands, and has features such as compliance with European and American radio usage regulations, frequency hopping anti-interference, long-distance two-way communication, and OTA radio/GNSS firmware upgrades, meeting the wireless communication needs of the lawn mower market.

1.1. Product Features

- Supports the European and American ISM unlicensed frequency bands: 863-870MHz and 902-928MHz
- Supports LBT+AFA (29 frequency hopping channels in Europe and 60 frequency hopping channels in America), meeting local radio regulations in Europe and America
- Supports one-click binding for point-to-point and point-to-multipoint communication
- Integrated transceiver meets the needs of differential data transmission and long-distance two-way communication
- Fast frequency hopping and strong anti-interference capabilities
- Meets the RF power control requirements of the European and American ISM bands, supporting 13.64 dbm in Europe and 20.24 dbm in America
- Open upgrade protocol, supports OTA upgrades of radio/GNSS firmware
- Supports IC, CE, and FCC certifications
- Proprietary protocol, ultra-long communication range, unimpeded communication between front and back yards

1.2 Applications

Smart lawn mower, IoT wireless communication

2. Instructions

2.1. LBT+AFA(AFC mode)

2.1.1 Base Station

Radio configuration:

\$\$01SET FREQQQ 800M/900M (The data transmission will be reset after sending this command. Be careful not to send this command concurrently with other commands.)

\$\$01SET DEFAULT (The data transmission will be reset after sending this command. Be careful not to send this command concurrently with other commands.)

GNSS configuration:

```
freset
fix auto
log com3 rtcml033b ontime 10
log com3 rtcml005b ontime 5
log com3 rtcml074b ontime 2 1
log com3 rtcml084b ontime 2 0
log com3 rtcml094b ontime 2 1
log com3 rtcml124b ontime 2 0
log com3 rtcml114b ontime 2 1
log com3 gpzda ontime 1
saveconfig
```

2.1.2 Mobile Station

Radio configuration:

\$\$01SET FREQQQ 800M/900M (The data transmission will be reset after sending this command. Be careful not to send this command concurrently with other commands.)

\$\$01QB111111 (111111 is the 6-digit base station SN)

GNSS configuration:

```
freset
interfacemode com3 auto auto on
log gpgga ontime 1
log com3 gpzda ontime 1
saveconfig
```

Note:

- 1、 After successful configuration, the mobile station's radio will display the RX_Package_Num field, indicating that it has received base station data.
- 2、 If satellite search is not in progress indoors, communication automatically switches to fixed frequency; in outdoor environments, communication switches to frequency hopping.

2.2 Half-duplex mode (TDD mode)

2.2.1 Base Station

Radio configuration:

```

$$01SET SMARTNODE TDD
$$01SET AIRBT 11000
$$01FRE=863.0500

```

GNSS configuration:

```

freset
fix auto
log com3 rtcml033b ontime 10
log com3 rtcml005b ontime 5
log com3 rtcml074b ontime 1
log com3 rtcml084b ontime 1
log com3 rtcml094b ontime 1
log com3 rtcml124b ontime 1
log com3 rtcml114b ontime 1
saveconfig

```

2.2.2 Mobile Station

Radio configuration:

```

$$01SET SMARTNODE TDD
$$01SET AIRBT 11000
$$01FRE=863.0500

```

GNSS configuration:

```

freset
interfacemode com3 auto auto on
log gpgga ontime 1
saveconfig

```

2.3 General command

1、 Read radio Information

Example:

```
$$01LOG RADIOINFO
```

2、 Restart radio

Example:

```
$$01RADIORESET
```

3、 Set to Default Configuration

Example:

```
$$01SET DEFAULT
```

4、 Set the Air Baud Rate

Format:

```
$$01SET AIRBT <baudrate>
```

Parameter:

Baudrate valid values: 3000, 6000, 11000, 12000, 13000, 15000, 18000, 31000, 52000, 620000

Example:

```
$$01SET AIRBT 11000
```

5、 Set the COM Port for Data Output

Format:

```
$$01SET <COM1/2> OUTPUT
```

Parameter:

COM port valid value: 1, 2

Example:

```
$$01SET COM1 OUTPUT
```

6、 Set radio Operating Mode

Format:

```
$$01SET SMARTNODE <OFF/AFC/TDD>
```

Parameter:

OFF: Single transmit and single receive mode, TDD: Half duplex mode, AFC: Automatic frequency hopping mode

Example:

```
$$01SET SMARTNODE OFF
```

7、Set radio Receive/Transmit

Format:

```
$$01RX/TX
```

Parameter:

RX: receive, TX: transmit

Example:

```
$$01RX
```

8、Configure Frequency Commands for Half-Duplex Mode

Format:

```
$$01FRE=915.0500\r\n
```

NOTE:

Requires three decimal places and four decimal places. This command is not effective in AFC mode.

3. QD302E Product Size

In this section, product photo, three-side views and the dimension of QD302E is provided for customers' further hardware design and installation.

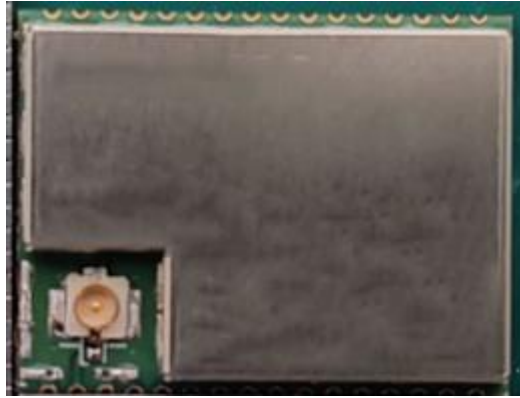


Figure 1. QD302E Product Photo

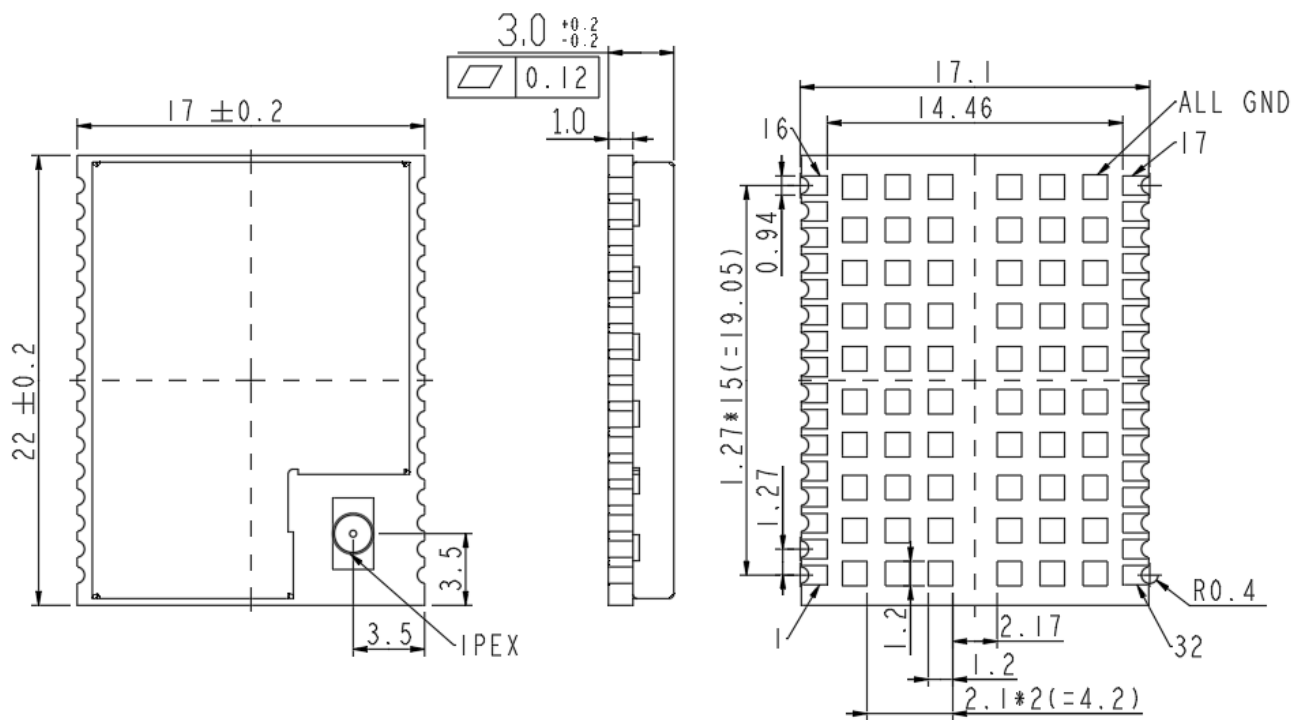


Figure 2. QD302E Dimension View

4. Pin Arrangement and Definition

QD302E is surface-mount OEM Module which integrates 32 Pin (pitch 1.27mm).

1	GND	GND	32
2	ANT	RES	31
3	GND	RES	30
4	RES	GND	29
5	RES	RES	28
6	GND	RES	27
7	RES	GND	26
8	RES	UART2_TX	25
9	RES	UART2_RX	24
10	NC	GND	23
11	GND	T/RX_FLAG	22
12	UART1_RX	SYS_FLAG	21
13	UART1_TX	GND	20
14	RES	GND	19
15	RSTN	VCC	18
16	GND	VCC	17

Figure 3. QD302E Includes 32-Pin Pad

Table 1. Pin Definition of QD302E 32-Pin Pad

PIN	SIGNAL	TYPE	DESCRIPTION
1	GND	GND	Ground Reference
2	ANT	I/O	ANT_Input/Output
3	GND	GND	Ground Reference
4~5	RES	I/O	General-purpose input/output
6	GND	GND	Ground Reference
7~9	RES	I/O	General-purpose input/output
10	NC	/	/
11	GND	GND	Ground Reference
12	UART1_RX	I	UART1_RX
13	UART1_TX	O	UART1_TX
14	RES	I/O	General-purpose input/output
15	RSTN	I	Quick reset without clearing user configuration
16	GND	GND	Ground Reference
17~18	VCC	PWR	POWER
19~20	GND	GND	Ground Reference

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PIN	SIGNAL	TYPE	DESCRIPTION
21	SYS_FLAG	O	SYS_FLAG
22	T/RX_FLAG	O	T/RX_FLAG
23	GND	GND	Ground Reference
24	UART2_RX	I	UART2_RX
25	UART2_TX	O	UART2_TX
26	GND	GND	Ground Reference
27~28	RES	I/O	General-purpose input/output
29	GND	GND	Ground Reference
30~31	RES	I/O	General-purpose input/output
32	GND	GND	Ground Reference

FCC Statement

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

OEM instructions

1. Applicable FCC rules

This device complies with part 15.247 of the FCC Rules.

a. The specific operational use conditions

This module can be used in IoT devices. The input voltage to the module is nominally 3.3~3.6 V_{DC}.

The operational ambient temperature of the module is

–40 ~ 85 °C

2. Limited module procedures

N/A

3. Trace antenna design

N/A

4. RF exposure considerations

The equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

5. Antenna

Antenna type: Omni Antenna, Peak antenna gain 2.15 dBi;

6. Label and compliance information

An exterior label on OEM's end product can use wording such as the following:

“Contains FCC ID: 2ACHBQD302E ”

7. Information on test modes and additional testing requirements

- 1) The modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).
- 2) The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration. It is important to note that host product manufacturers should not assume that because the modular transmitter is certified that they do not have any responsibility for final product compliance.
- 3) If the investigation indicates a compliance concern the host product manufacturer is obligated to mitigate the issue. Host products using a modular transmitter are subject to all the applicable individual technical rules as well as to the general conditions of operation in Sections 15.5, 15.15, and 15.29 to not cause interference. The operator of the host product will be obligated to stop operating the device until the interference have been corrected .
- 4) Additional testing, Part 15 Sub part B disclaimer:
The device is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host / module combination need to be evaluated against the FCC Part 15B criteria for unintentional radiators in order to be properly authorized for operation as a Part 15 digital device. The host integrator installing this module into their product must ensure that the final composite product complies with the FCC requirements by a technical assessment or evaluation to the FCC rules, including the transmitter operation and should refer to guidance in KDB 996369. For host products with certified modular transmitter, the frequency range of investigation of the composite system is specified by rule in Sections 15.33(a)(1) through (a)(3), or the range applicable to the digital device, as shown in Section 15.33(b)(1), whichever is the higher frequency range of investigation When testing the host product, all the transmitters must be operating.

The transmitters can be enabled by using publicly-available drivers and turned on, so the transmitters are active. When testing for emissions from the unintentional radiator, the transmitter shall be placed in the receive mode or idle mode, if possible. If receive mode only is not possible then, the radio shall be passive (preferred) and/or active scanning. In these cases, this would need to enable activity on the communication BUS (i.e., PCIe, SDIO, USB) to ensure the unintentional radiator circuitry is enabled. Testing laboratories may need to add attenuation or filters depending on the signal strength of any active beacons (if applicable) from the enabled radio(s). See ANSI C63.4, ANSI C63.10 for further general testing details. The product under test is set into a link/association with a partnering device, as per the normal intended use of the product. To ease testing, the product under test is set to transmit at a high duty cycle, such as by sending a file or streaming some media content.