PDDAXLQUE DX-LR03

PDDAXLQUE DX-LR03 433/475MHz LoRa Module User Manual

Model: DX-LR03 (LR03-433/475Mhz Set)

1. Introduction

The PDDAXLQUE DX-LR03 is an ultra-long-range LoRa communication module designed for reliable wireless data transmission. It operates in the 433/475MHz frequency bands and features a PA amplifier for transmission power up to 30dBm, enabling communication distances of up to 10KM. This module utilizes UART serial communication and supports a comprehensive set of AT commands for flexible configuration and control, making it suitable for various IoT and remote sensing applications.

2. Package Contents

The standard package for the DX-LR03 module typically includes the following components. For first-time users, purchasing a developer toolkit is recommended for quick testing and validation.

Image: Components of the DX-LR03 developer package. This typically includes two LR03 Modules, two USB Cables, two glue stick antennas, and two USB to TTL Adapter Boards.

- DX-LR03 LoRa Module (x2)
- USB Cable (x2)
- Glue Stick Antenna (x2)
- USB to TTL Adapter Board (x2)

3. Product Features

- **Chipset:** ASR6601 SOC Chip with PA Amplifier.

- **Frequency Bands:** Supports 433-475MHz (LR03-433T30D) and 850-931MHz (LR03-900T30D) variants.
- **Transmission Distance:** Up to 10KM in line-of-sight conditions.
- **Transmission Power:** 0 to +27dBm (up to 30dBm with PA amplifier).
- **Receiver Sensitivity:** Maximum -138dBm.
- **Communication Interface:** UART Serial Port.
- **AT Command Support:** Extensive AT command set for module configuration.
- **Operating Voltage:** 4-5.5V (Typical: 5V).
- **Certifications:** CE, FCC, RoHS compliant.
- **Anti-interference:** Equipped with an RF shielding cover for strong anti-interference, anti-static, and EMC electromagnetic compatibility.

4. Module Overview and Pinout

The DX-LR03 module features a compact design with clearly labeled pins for easy integration. Understanding the pinout is crucial for proper connection and operation.

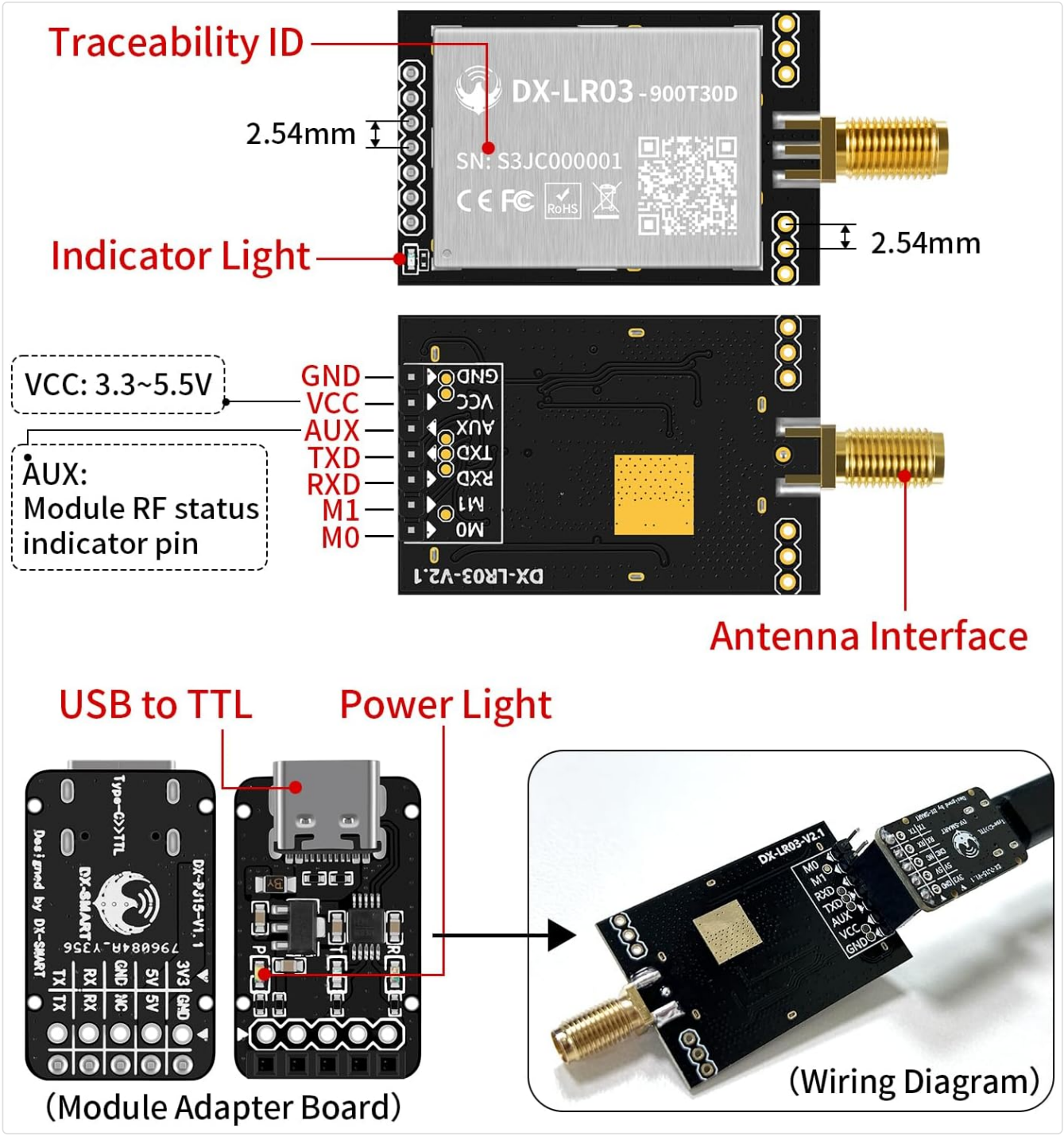

Image: Detailed view of the DX-LR03 module, highlighting the Traceability ID, Indicator Light, VCC (3.3-5.5V), GND, AUX (Module RF status indicator pin), TXD, RXD, M1, M0 pins, and the Antenna Interface.

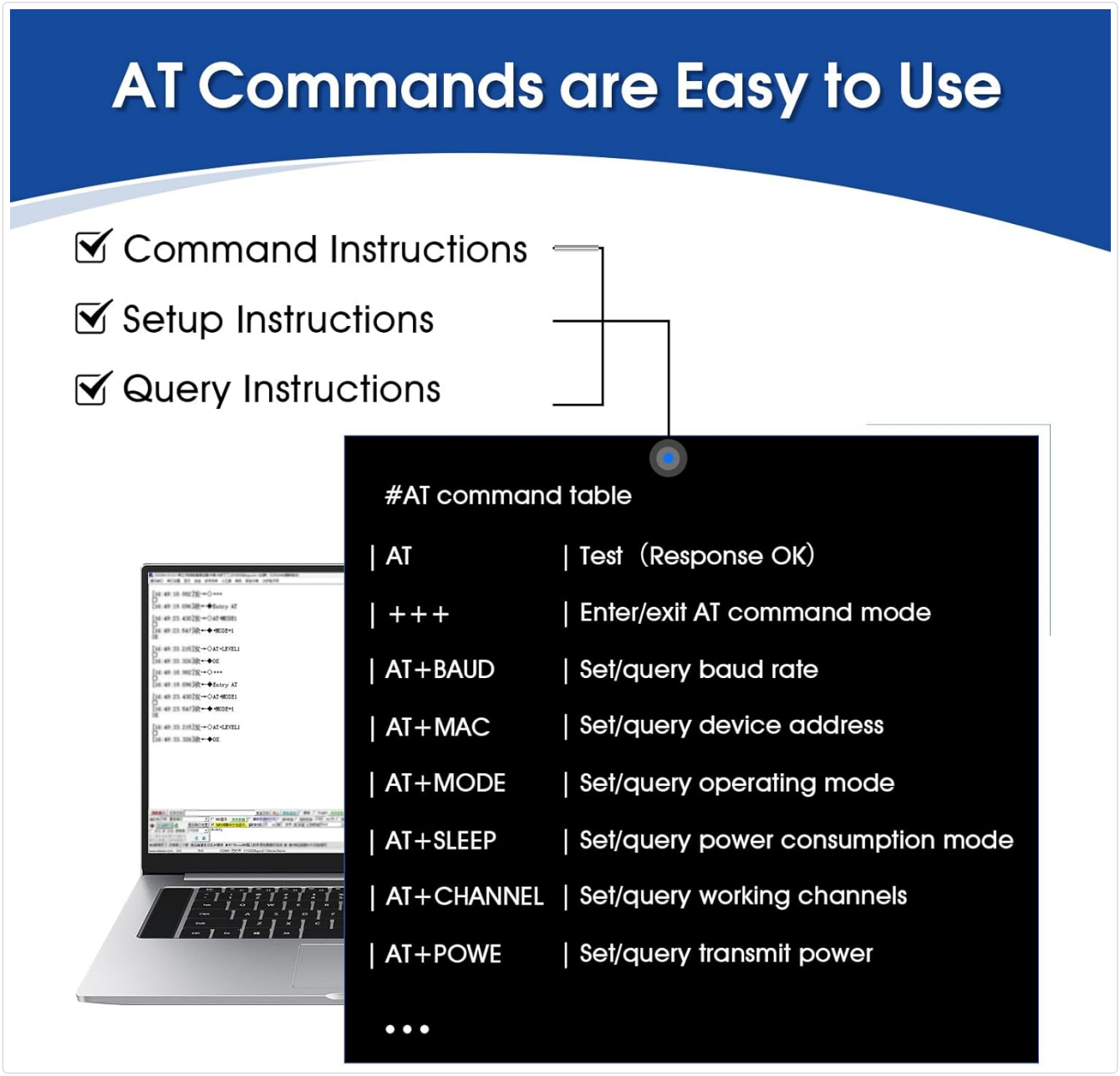

Image: The DX-LR03 module connected to a USB to TTL adapter board, illustrating the connection points and the power indicator light on the adapter.

Module Dimensions

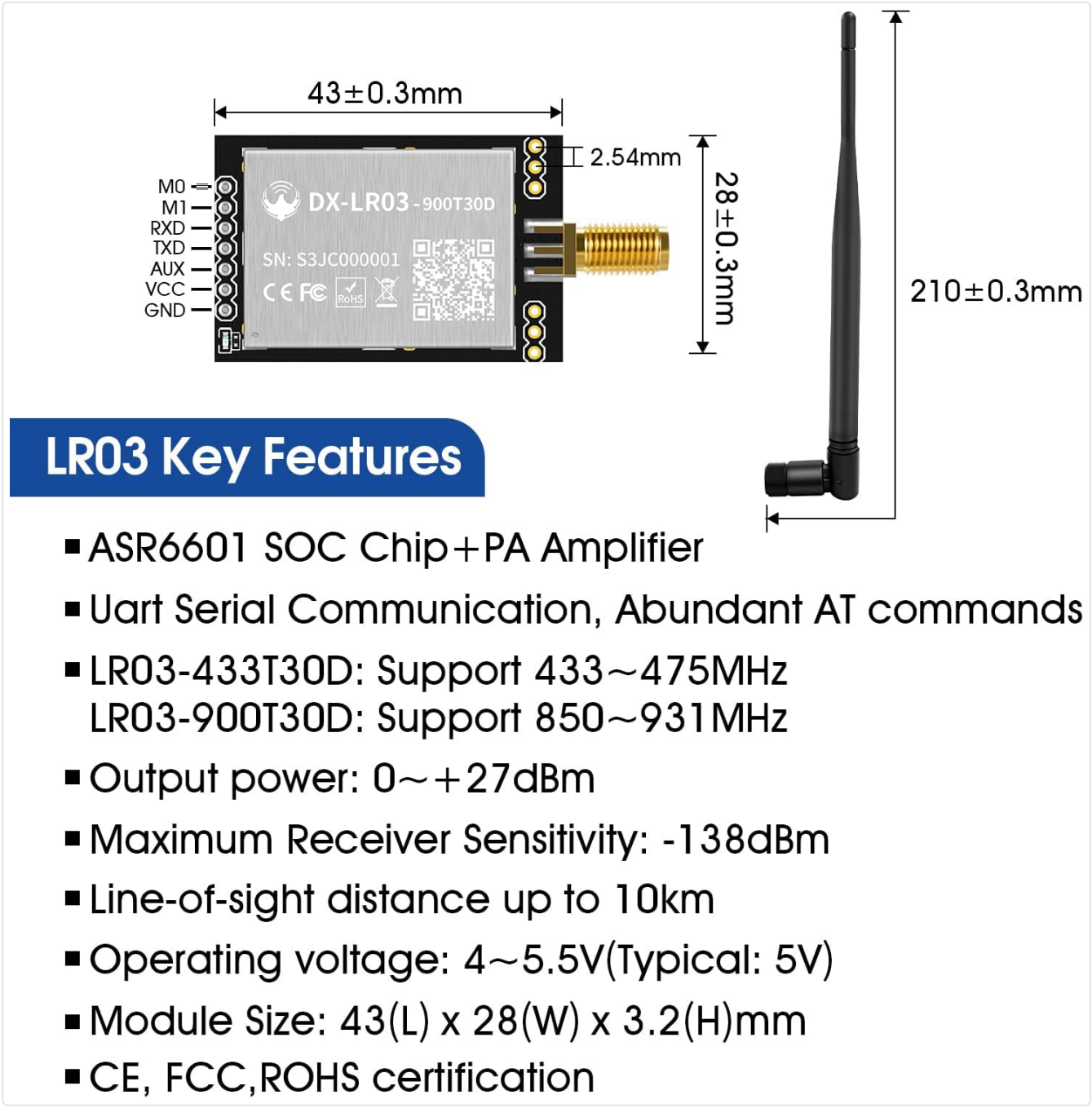

Image: Physical dimensions of the DX-LR03 module (43 x 28 x 3.2 mm) and a typical 210 mm glue stick antenna.

5. Setup and Connection

To begin using the DX-LR03 module, follow these steps for proper connection and initial setup:

1. **Connect Antenna:** Securely attach the provided glue stick antenna to the SMA connector on the DX-LR03 module.
2. **Connect to USB to TTL Adapter:** Connect the DX-LR03 module to the USB to TTL adapter board. Ensure correct pin alignment for VCC, GND, TXD, and RXD.
3. **Connect to Computer:** Plug the USB to TTL adapter board into your computer's USB port.
4. **Driver Installation:** If necessary, install the appropriate drivers for the USB to TTL adapter. These drivers are typically available from the adapter manufacturer's website.
5. **Serial Port Software:** Use a serial port debugging tool (e.g., Uart Assistant Tools) on your computer to communicate with the module. Configure the baud rate (default 9600bps), data bits (8), parity (None), and stop bits (1).
6. **Power On:** The module will power on once connected to the USB port via the adapter. Observe the power indicator light on the adapter.

6. Operating Modes

The DX-LR03 module supports various working modes for data transmission, including transparent transmission, fixed-point transmission, and broadcast transmission.

Image: Visual representation of the three primary working modes: transparent, broadcast, and fixed-point transmission, showing how data is routed based on channel and address settings.

- **Transparent Transmission:** In this mode, data is transmitted directly between modules on the same channel without addressing. It requires both sender and receiver to be configured to the same channel.
- **Broadcast Transmission:** Data is sent to all modules within range that are configured to the same channel. This mode does not require specific addressing.
- **Fixed-Point Transmission:** Data is sent to a specific module identified by its unique address and channel. This allows for targeted communication between devices.

These modes can be configured using AT commands. Refer to the AT Command section for details on setting the operating mode.

7. AT Commands

The DX-LR03 module is configured and controlled using a set of AT commands. These commands allow you to set parameters such as mode, frequency, MAC address, bandwidth, spreading factor, and more.

Image: A partial list of AT commands and their functions, such as entering/exiting AT command mode, setting baud rate, MAC address, operating mode, sleep mode, working channels, and transmit power.

Common AT Commands:

- **AT:** Test instruction (responds with OK).
- **+++:** Enter/exit AT command mode.
- **AT+BAUD:** Set/query serial baud rate.
- **AT+MAC:** Set/query device address.
- **AT+MODE:** Set/query operating mode.
- **AT+SLEEP:** Set/query power consumption mode.
- **AT+CHANNEL:** Set/query working channels.
- **AT+POWE:** Set/query transmit power.

For a complete list of AT commands and detailed usage instructions, please refer to the comprehensive technical documentation available on the manufacturer's website.

Image: Screenshot of the Uart Assistant Tools, a software utility for configuring and testing the LoRa module via serial port, showing options for baud rate, channel, address, and AT commands.

8. Serial Communication

The DX-LR03 module uses UART serial communication for transparent data transmission between devices. This allows for straightforward integration with microcontrollers and other serial-enabled systems.

Baud Rate Settings:

The module supports various baud rates, which can be configured using AT commands. The default setting is 9600bps.

- Supported Baud Rates: 1200, 2400, 9600, 19200, 38400, 57600, 115200, 128000 bps.
- Default Setting: 9600bps, 8 data bits, No parity, 1 stop bit (9600/8/N/1).

Ensure that the baud rate of your host device (e.g., microcontroller, PC serial port) matches the module's configured baud rate for successful communication.

9. Technical Specifications

Below are the key technical specifications for the DX-LR03 LoRa module:

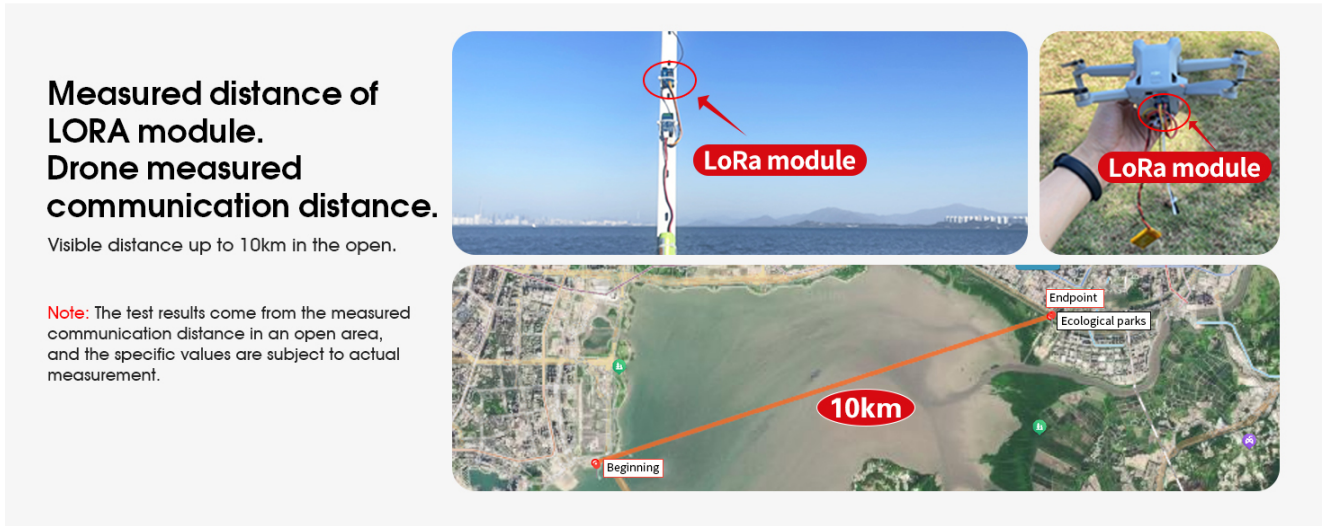

Image: A detailed table outlining the technical parameters of the DX-LR03 module, including its ASR6601 chip, UART interface, 0-27dBm firing power, 10km communication distance, 433-475MHz/850-931MHz frequency bands, and more.

Parameter	Details
Brand	PDDAXLQUE

Parameter	Details
Item Model Number	LR03-433/475Mhz Set
Manufacturer	DX-SMART
Chip Model	ASR6601 SOC + PA amplifier
Communication Interface	LPUART
Transmission Power	0 ~ +27dBm
Communication Distance	Visible distance up to 10km in open areas
Frequency Band	433-475MHz / 850-931MHz
AT Instruction	Simple AT Instruction set available
Transmission Method	Transparent transmission, Fixed-point transmission, Broadcast transmission
Operating Temperature	-40°C ~ +85°C
Operating Voltage	LR03-A: 4V ~ 5.5V (Typical 5V)
Modulation Method	Spread Spectrum Modulation
Sensitivity	-138dBm
RF Input Impedance	50Ω

Measured Communication Distance:

The DX-LR03 module is capable of achieving significant communication distances under optimal conditions.

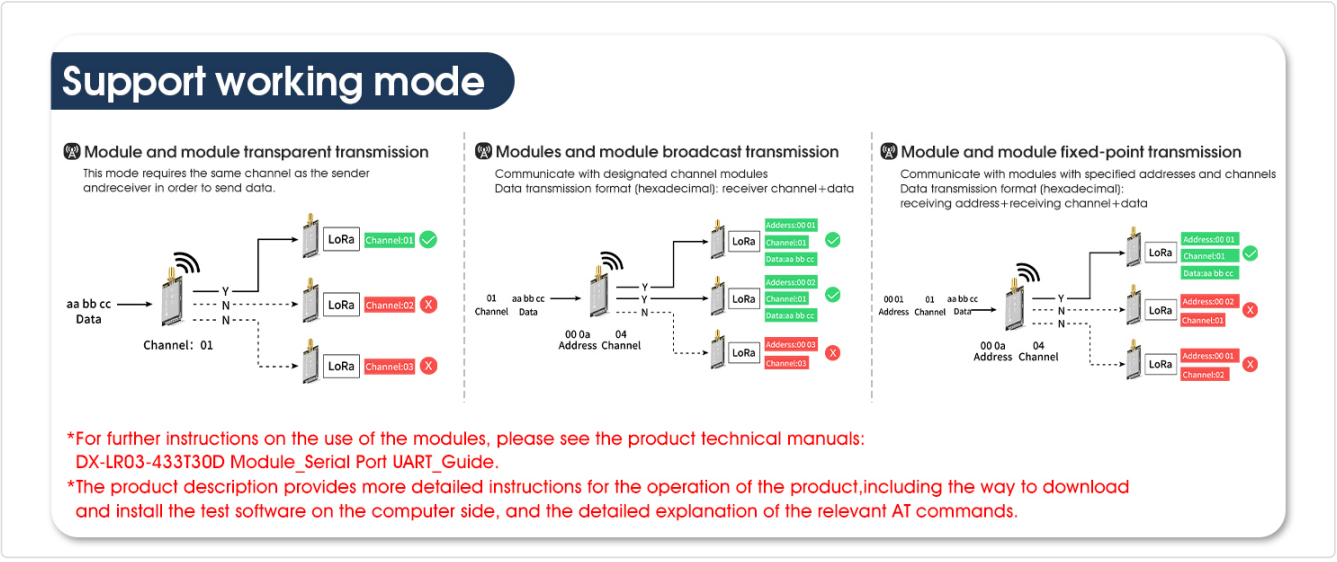

Image: Illustration of a measured 10km communication distance for the LoRa module in an open area, with the module mounted on a drone and a pole. Note: Actual performance may vary based on environmental factors.

10. Maintenance

To ensure the longevity and optimal performance of your DX-LR03 LoRa module, consider the following maintenance guidelines:

- **Environmental Conditions:** Operate the module within the specified temperature range (-40°C to +85°C). Avoid exposure to extreme humidity, dust, or corrosive environments.
- **Physical Handling:** Handle the module with care to prevent physical damage to components, pins, or the antenna connector.
- **Antenna Connection:** Ensure the antenna is securely connected. A loose connection can degrade performance.
- **Power Supply:** Provide a stable power supply within the recommended voltage range (4V-5.5V). Unstable power can affect module operation.
- **Cleaning:** If necessary, gently clean the module with a dry, soft cloth. Avoid using liquids or harsh chemicals.

11. Troubleshooting

If you encounter issues with your DX-LR03 module, refer to the following common troubleshooting steps:

- **No Communication via Serial Port:**
  - Verify that the USB to TTL adapter drivers are correctly installed.
  - Check the serial port settings (baud rate, data bits, parity, stop bits) in your software to ensure they match the module's configuration (default: 9600/8/N/1).
  - Confirm that the TXD and RXD pins are correctly connected between the module and the adapter (TXD to RXD, RXD to TXD).
  - Ensure the module is properly powered (VCC and GND connections are correct).
- **Poor Communication Range:**
  - Check if the antenna is securely attached and undamaged.
  - Ensure there are no significant obstructions (e.g., thick walls, metal structures) between the transmitting and receiving modules.
  - Verify that both modules are operating on the same frequency band and channel.
  - Check the transmit power setting using AT commands; ensure it is set appropriately for your application.
- **Module Not Responding to AT Commands:**
  - Ensure you are sending the '+++' command to enter AT command mode before sending other commands.
  - Check for correct serial port settings.
  - Verify the module is powered correctly.
- **Intermittent Communication:**
  - Check for potential sources of electromagnetic interference in the operating environment.
  - Ensure power supply stability.
  - Verify that the module's operating temperature is within the specified range.

12. Support and Resources

For further technical assistance, detailed documentation, and development tools, please refer to the following resources:

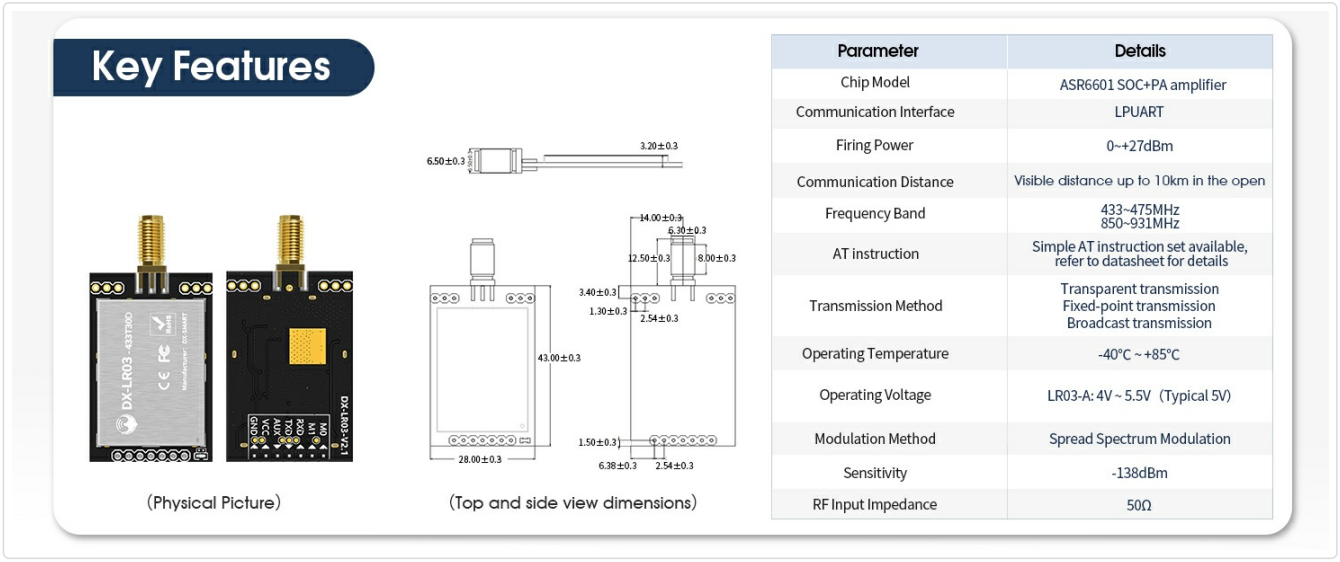

Image: A representation of the online resources available, including service support, video tutorials, technical documentation, test tools, and hardware information for the LoRa module.

- **Official Website:** Visit the PDDAXLQUE or DX-SMART official website for the latest product information, datasheets, and firmware updates.
- **Technical Documentation:** Comprehensive technical documentation, including detailed AT command sets, module footprints, and reference design schematics, is available for download.
- **Development/Test Tools:** Access development and test tools to help verify module functionality and accelerate product development.
- **Customer Support:** If you encounter any problems, please contact customer support through the User Guide → Product Information → Service Support section on the product page or manufacturer's website.

13. Warranty Information

Please refer to the product packaging or the manufacturer's official website for specific warranty terms and conditions. Typically, electronic modules come with a limited warranty covering manufacturing defects for a specified period from the date of purchase. Keep your proof of purchase for warranty claims.