FSC-BW246 User Guide

Release 3.3.0

Table of contents

[中文版]

This guide applies to:

FSC-BW246 2.4GHz Wi-Fi 4 + Dual-Mode BT 4.2 Module.

This guide consists of the following parts:

[中文版]

Chapter 1

Hardware Design

[中文版]

1.1   Module Pin Diagram

Pin diagram with FSC-BW246:
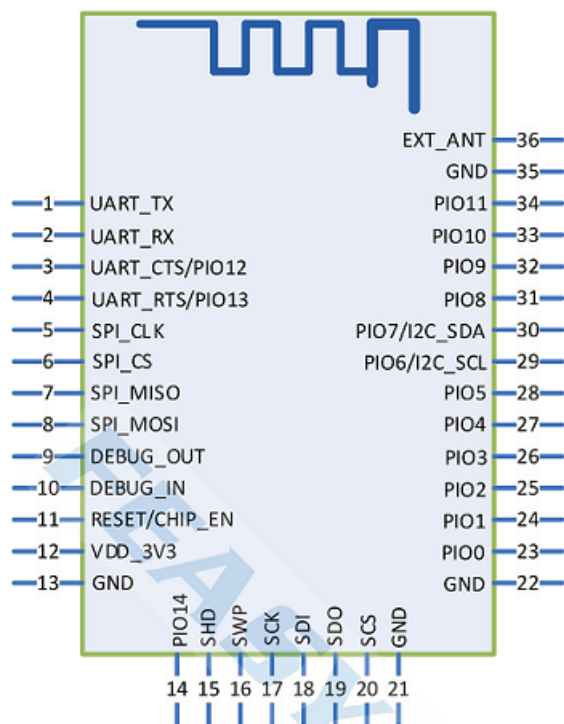
1.2 Pin Description

Pin	Pin Name	Type	Descriptions
1	UART_TX	O	UART Data output
2	UART_RX	I	UART Data input
3	UART_CTS	I	UART clear to send (active low)
4	UART_RTS	O	UART request to send (active low)
9	DEBUG_OUT	I/O	Debug Interface (Data OUT)
10	DEBUG_IN	I/O	Debug Interface (Data IN)
11	RE-SET/CHIP_EN	I	External reset input, active low.Set this pin low reset the module.
12	VDD_3V3	VDD	Power supply voltage 2.3~3.3V
13	GND	VSS	Power Ground
21	GND	VSS	Power Ground
22	GND	VSS	Power Ground
32	LED0	I/O	Bluetooth is connected to output high
33	LED1	I/O	Wi-Fi is connected to output high level
35	GND	VSS	RF Ground
36	EXT_ANT	O	RF signal output

Note: This section provides brief I/O pin descriptions. For detailed descriptions and precautions, please refer to FSC-BW246 Datasheet .

1.3 Hardware Interface

- GPIO

- PWM

- UART

- SPI SLAVE

- I2S Master/Slave

- Analog Input/Output

1.4 Hardware Design Note

- The simple test of the module only requires connecting VDD/GND/UART_RX/UART_TX to be used

- After drawing the schematic diagram, please send it to Feasycom for review to avoid the Bluetooth or Wi-Fi distance not achieving the best effect

Chapter 2

Functional Description

[中文版]

2.1   Basic Specifications

Model	FSC-BW246
Bluetooth Version	Bluetooth V4.2 dual mode
Bluetooth Protocol	BLE & BR/EDR
Bluetooth Frequency Band	2.4G
Wi-Fi Standard	IEEE 802.11 b/g/n
Wi-Fi Frequency Band	2.4G

2.2   Module Default Parameter

2.2.1   Wi-Fi Default Settings

Wi-Fi Mode	STA Mode
Local AP SSID	FSC-BW246-AP
Local AP Password	12345678
Local AP Channel	1
Local AP IP Address	192.168.1.1

2.2.2 Bluetooth Default Settings

BLE Name	FSC-BW246-LE
BLE Mode	LE-Peripheral
SPP Name	**FSC-BW246**
SPP Pair Code	0000

2.2.3 UART Default Settings

Baudrate	921600bps
Data Bits	8
Parity	None
Stop Bits	1

2.3 Support Communication Protocols

2.3.1 Support Bluetooth protocol

- SPP Client (Serial Port Profile)

- SPP Server (Serial Port Profile)

- GATT Server (Generic Attribute Profile)

- HID (HID Human Interface Device Profile)

2.3.2 Support Wi-Fi protocol

- TCP (Transmisson Control Protocol)

- UDP (User Datagram Protocol)

- HTTP (Hypertext Transfer Protocol)

- MQTT (Message Queuing Telemetry Transport)

- SSL/TLS(Secure Sockets Layer/Transport Layer Security)

- WEB SOCKET

Chapter 3

Quick Development Kit

[中文版]

3.1 Datasheet

- FSC-BW246 Datasheet

3.2 Evaluation Board

- FSC-DB105 : Feasycom USB-to-Serial Port Bluetooth &Wi-Fi Data Transmission Application Development Board.

3.3 AT Command Set

- FSC-BW246 General Data AT Command Set

3.4 Serial Port Tool

- Feasycom Serial Port Tool : A serial communication analysis tool based on Windows PC.

3.5 APP&SDK

- FeasyBlue App : Feasycom App & SDK resource supporting Android and iOS, which enables functions such as Bluetooth BLE & SPP data communication test, Feasycom

module firmware version reading, and parameter configuration and OTA AT commands etc.

3.6   Firmware Upgrade

- OTA Upgrade

    – Tools : FeasyBlue App OTA Upgrade 、OTA Upgrade By AT Command.

    – User Guide : Please refer to FSC-BW246 - OTA Upgrade

Chapter 4

Quick Start

[中文版]

4.1 What you need

4.1.1 Required Hardware

- 1 x FSC-DB105-BW246 Development Kit : FSC-DB105 USB-to-Serial Port quick evaluation board integrated with FSC-BW246.

- 1 x Computer（Windows / Mac）

4.1.2 Software and Setup

- Feasycom Serial Port Tool : A serial port communication analysis tool based on Windows PC.

- Communication Interface : UART

- UART Configuration : 921600/8/N/1

4.2 Hardware Access

1.Connect the FSC-DB105-BW246 quick development kit to the PC via USB. The PC will automatically recognize the serial port and generate a virtual COMx port.
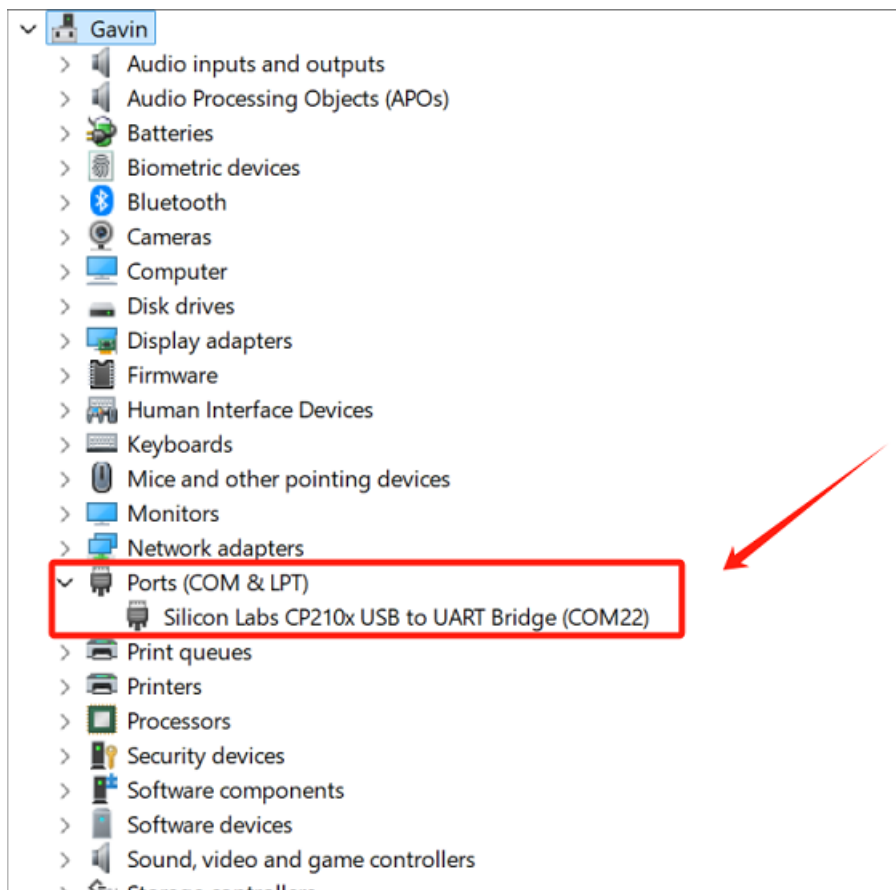
2.Run Feasycom Serial Port Tool on the PC, set the correct **COM** and **Baud**，and check the **New line**.
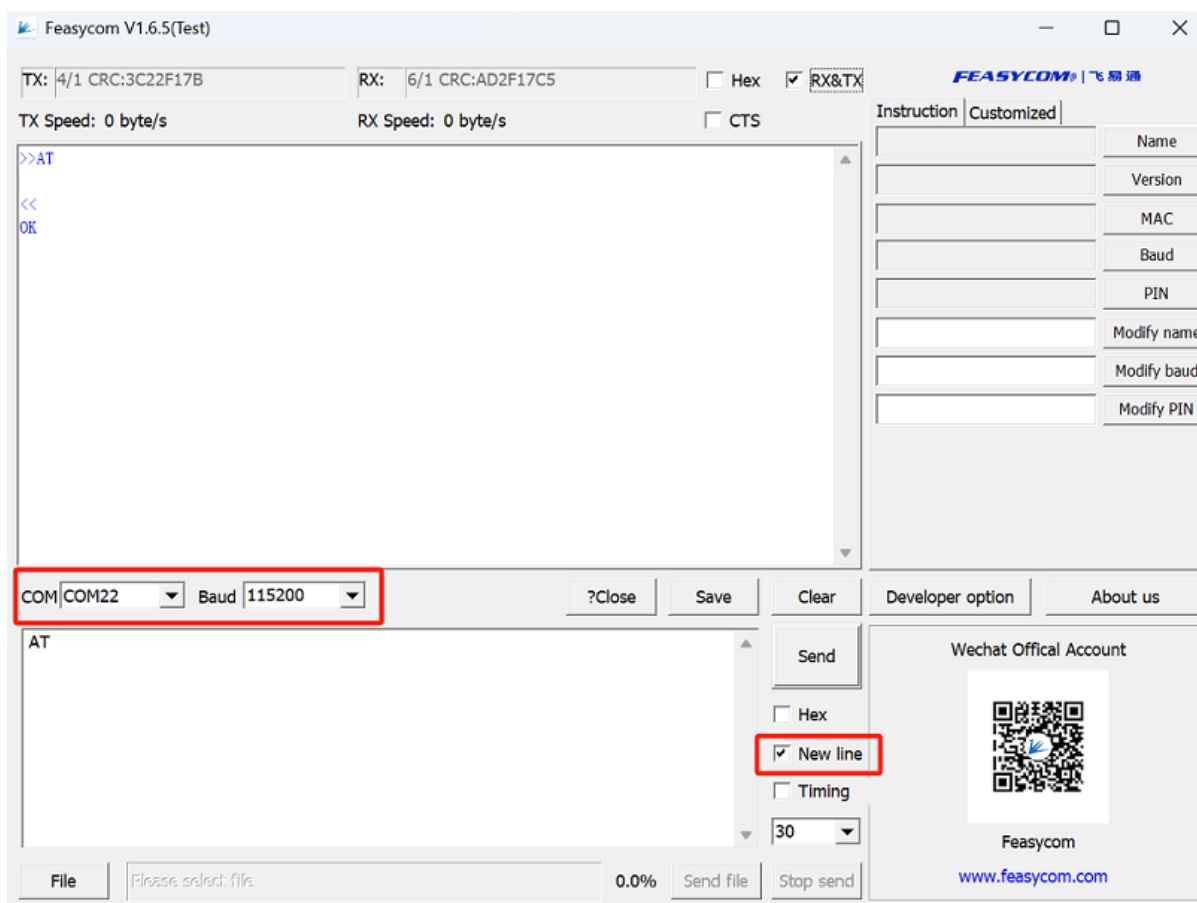
4.3 Communication test

The following lists a few basic general AT command test examples.

For more commands, please refer to FSC-BW246 General Data AT Command Set .

4.3.1 AT - UART Communication Test

Com- mand	AT\r\n
Response	\r\nOK\r\n
Descrip- tion	Test the UART communication between HOST and Module after power on, baudrate changed, etc.

Example:

```
Send:      <<AT\r\n
Response: >>\r\nOK\r\n     //successfully connected
```

4.3.2   AT+NAME - Read the BR/EDR Bluetooth name

Example:

```
Send:      <<AT+NAME\r\n
Response: >>\r\n+NAME=FSC-BW246\r\n     //Example, please refer to␣
↪the actual reading result
Response: >>\r\nOK\r\n
```

4.3.3   AT+VER - Read the current firmware version

Example:

```
Send:      <<AT+VER\r\n
Response: >>\r\n+VER=FSC-BW246,V45.1.5\r\n     //Example, please␣
↪refer to the actual reading result
Response: >>\r\nOK\r\n
```

Chapter 5

Obtain Firmware Version

[中文版]

5.1   FeasyBlue APP

After establishing BLE connection with the FSC-BW246 Bluetooth module via the FeasyBlue
App , view the firmware version information in the **Configuration** page.
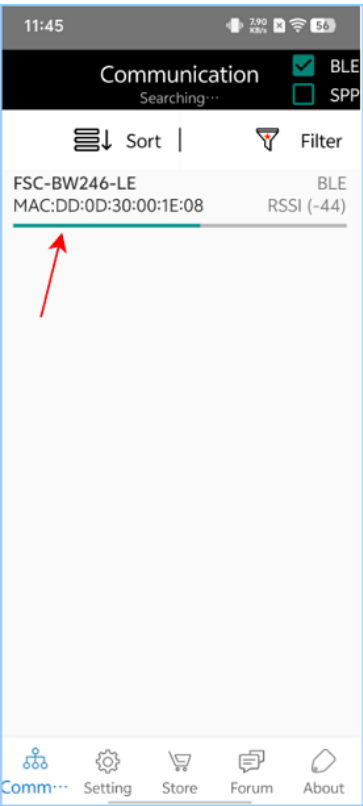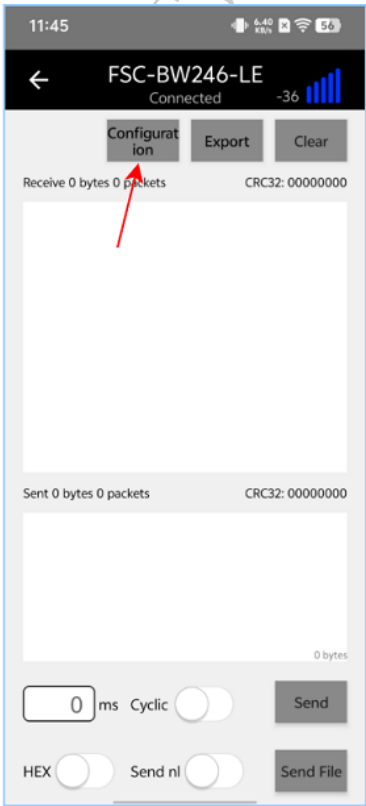
5.2   UART AT command

Send the **AT+VER** command via the UART to view the firmware version information of the module.

```
Send:     >>AT+VER
Response: <<+VER=FSC-BW246,V5.1.5   //Example, please refer to the
→actual reading result
Response: <<OK
```
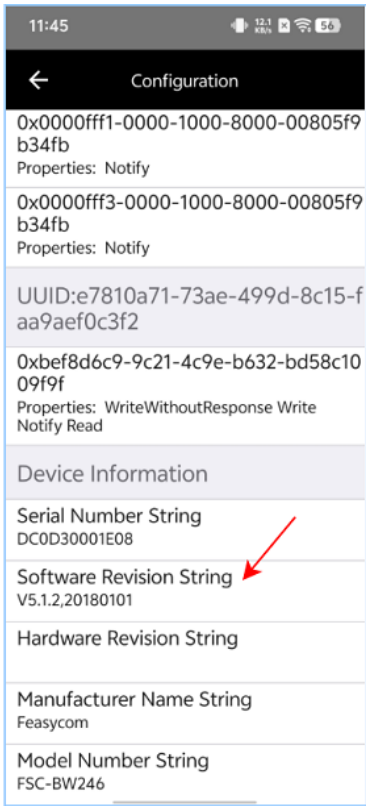
Chapter 6

Development Examples

[中文版]

6.1 Network Configuration

6.1.1 FeasyBlue Bluetooth Network Configuration

APP Download

- [FeasyBlue App]

User Guide

1.Open the **FeasyBlue App** and click on **Setting** - **WiFi Parameter Settings** to enter the WiFi param setting page.

2.On the WiFi param setting page, Check **BLE** , scan and select the WiFi param setting page.

3.Select and click on **BLE Network** to enter the BLE network page.

4.On the BLE network page, enter the enter the **SSID** 和 **password** of the Wi-Fi AP to be connected, and click **Start network config**.

5.After the distribution network is completed, It will show the **Distribution network is successful** and the **IP address** .

Example

(1)　　　　　　　　(2)　　　　　　　　(3)　　　　　　　　(4)
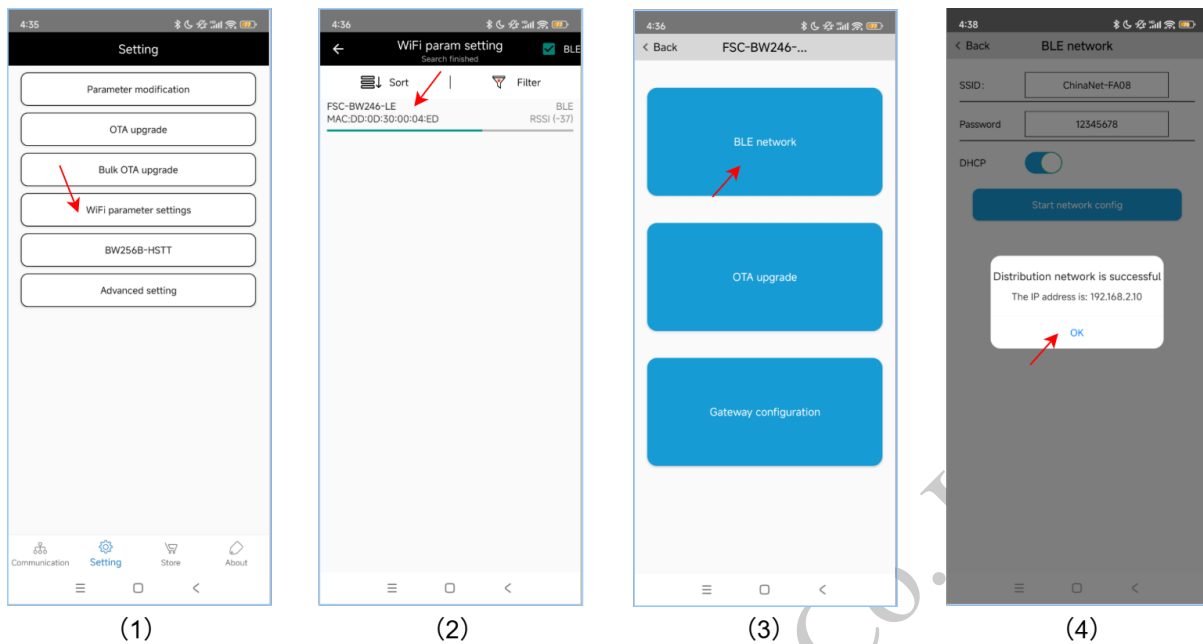
6.2　Throughput Mode Application

6.2.1　What Is Throughput Mode?

FSC-BW246 Bluetooth & Wi-Fi module features two data transmission modes: **Throughput Mode** and **Command Mode** .

The default command mode of the general data transmission application firmware. If you need to switch, you can refer to [FSC-BW246 General Data AT Command Set] , and using the **AT+TPMODE** command.

The working mechanisms and differences of the two data transmission modes are as follows:

- **Throughput Mode** :

  Without Bluetooth or Wi-Fi connection , the data received through the serial port is parsed in the format of AT instructions;

  Bluetooth or Wi-Fi connection has been established , all the data received through the serial port is sent to the remote end as is.

- **Command Mode** :

  Without Bluetooth or Wi-Fi connection , the data received through the serial port is parsed in the format of AT instructions;

  Bluetooth or Wi-Fi connection has been established , The data received through the

serial port is still parsed in the AT instruction format, which means data that needs to be sent to the remote end should be carried by AT commands.

6.2.2   Switch To Throughput Mode

Enter the Throughput Mode: Before establishing a Bluetooth or Wi-Fi connection, the FSC-BW246 module can use the command AT+TPMODE=1 to activate the transparent transmission mode.

```
Send:     >>AT+TPMODE=1                        //Set it to throughput␣
↪mode
Response: <<OK
```

When Bluetooth or Wi-Fi connection has been established, exit throughput mode:
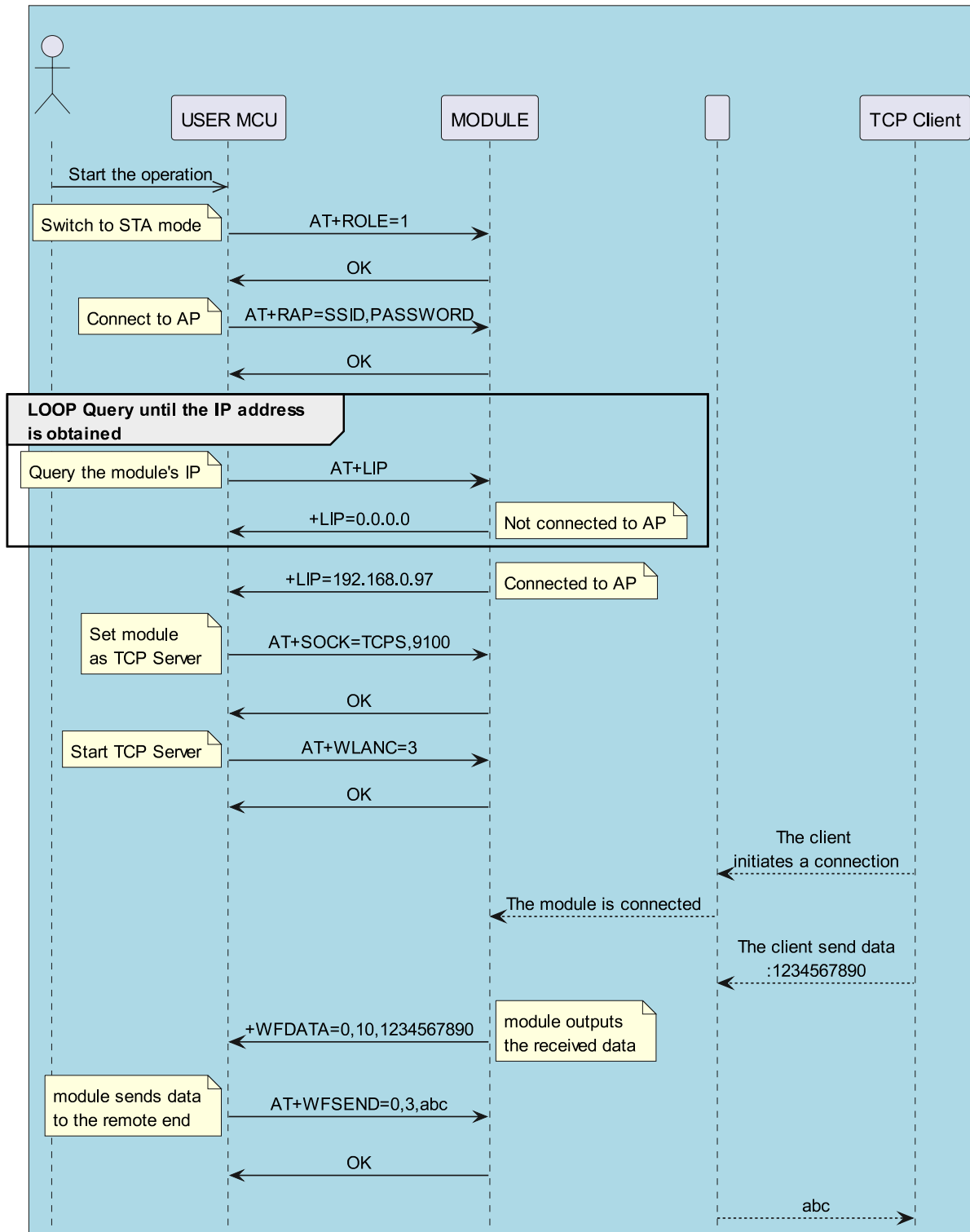
```
Send:     >> +++     //Send "+++". When operating on the host␣
↪computer's serial port tool, please uncheck "New Line" at this␣
↪time.
Response: << a                //Received response "a"
Send:     >> a                //Send "a". When operating on the host␣
↪computer's serial port tool, please uncheck "New Line" at this␣
↪time.
Response: << +ok     //Successfully exited
```

> **ⓘ Note**
>
> - Throughput Mode only takes effect when connections (such as Bluetooth, TCP/UDP) have been established. Therefore, the methods to exit transparent transmission also only work under such circumstances. When no connections have been established, you can directly use the AT command (AT+TPMODE) to switch modes.
>
> - The data format for sending and receiving mentioned above differs from that of AT commands. Standard AT commands end with **<CR><LF>** , while the above-mentioned control commands are strings that do not come with <CR><LF>.

6.2.3   Throughput Mode Application

Module to Phone Communication

6.3 TCP Server Application

6.3.1 Tools

- Feasycom Serial Port Tool ： A serial communication analysis tool based on Windows PC.

- (Option) TCP&UDP Test Tool ： Optional third-party PC-based network test tool are available.

6.3.2 TCP Server Application Example

6.3.3   TCP Server Application Flowchart

6.3.4   TCP Server Application Description

1.Set the module to Wi-Fi mode. If it is already in the current mode, you can skip this step.

```
Send:      <<AT+ROLE=1
Response: >>OK
```

2.The module is connected to the AP hotspot.

```
Send:      <<AT+RAP=SSID,PASSWORD
Response: >>OK
```

3.Query the IP address of the module to confirm that it has been connected to the network.

```
Send:      <<AT+LIP
Response: >>+LIP=192.168.0.97  //For local examples, please refer to↵
↪the actual IP address obtained by connecting to the AP
Response: >>OK
```

4.Set the module to TCP server with port 9100.

```
Send:      <<AT+SOCK=TCPS,9100
Response: >>OK
```

5.To create a TCP server for the module.

```
Send:      <<AT+WLANC=3
Response: >>OK
```

6.The PC and the module (FSC-BW246) are connected to the same AP hotspot. On the PC, a third-party network debugging tool is used to create an IP address for the TCP connection to the TCP Server (module) as a TCP client. And after establishing a TCP connection, send TCP data to the TCP Server (module), such as 1234567890.
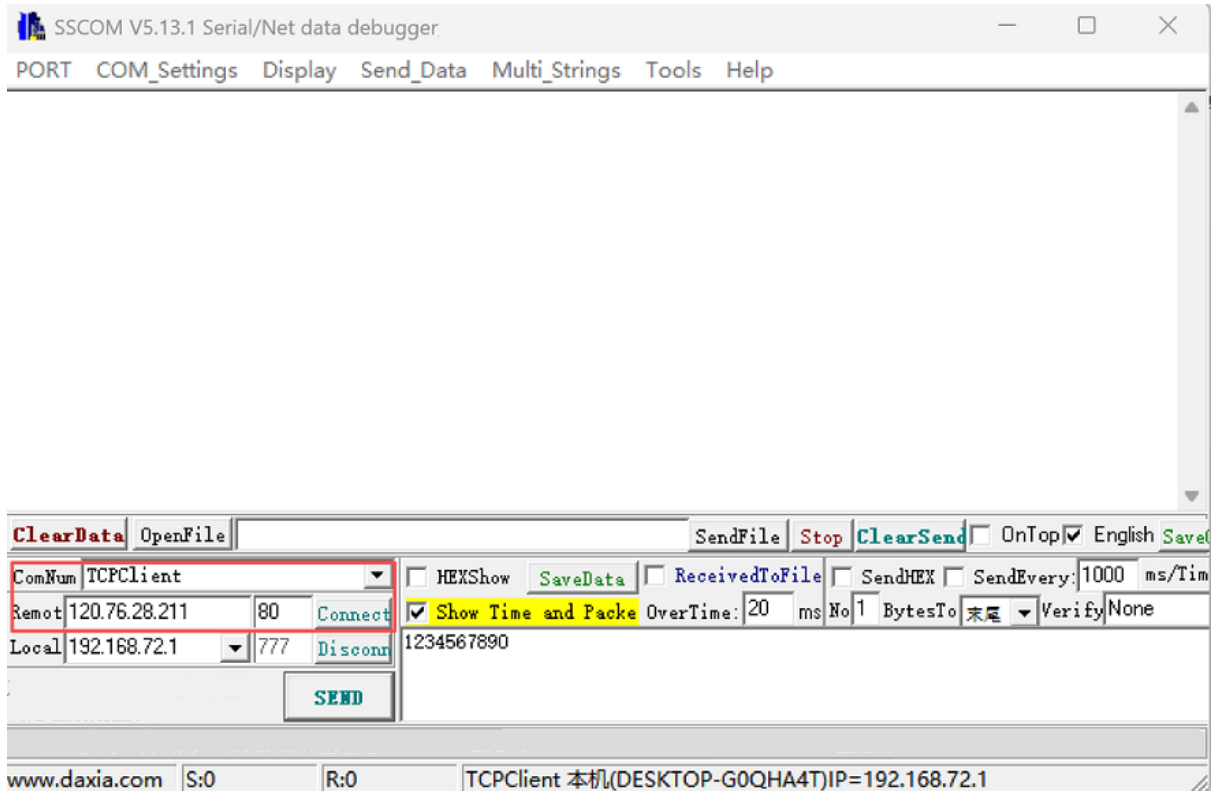
7.The module receives TCP data sent by the TCP Client. In instruction mode, an example of the received data format serial port response is as follows:

```
Response: >>+WFDATA=0,10,1234567890    //Supports simultaneously␣
→receiving data sent from multiple TCP clients to the TCP Server,␣
→with the first parameter being the connection ID
Response: >>+WFDATA=1,10,1234567890
Response: >>+WFDATA=2,10,1234567890
```

8.The module supports the simultaneous reception of data sent from multiple TCP clients to the TCP Server. The first parameter is the connection ID. In command mode, an example of the AT command operation is as follows:

```
Send:      <<AT+WFSEND=0,3,abc
Response: >>OK
```
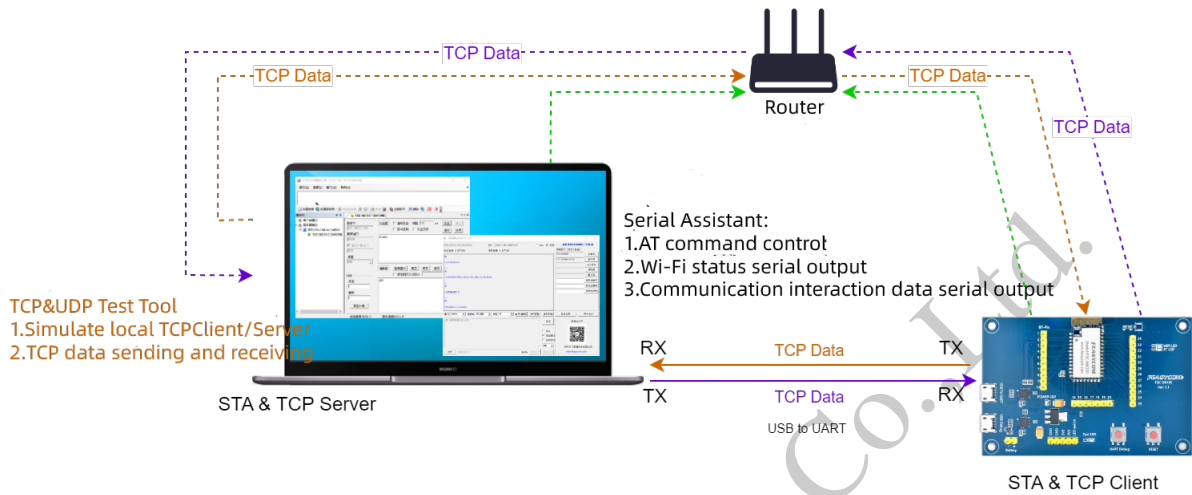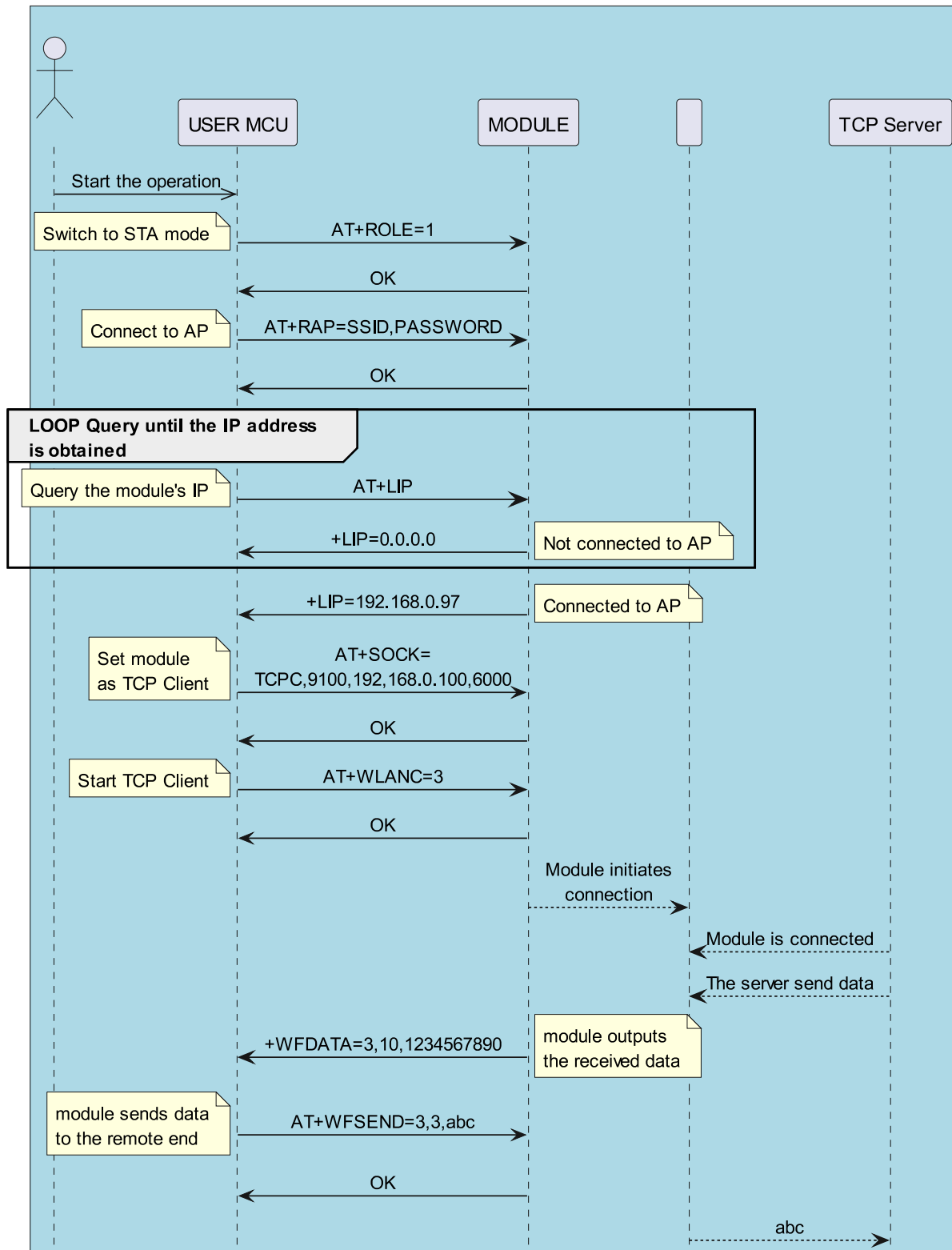
6.4   TCP Client Application

6.4.1   Tools

- Feasycom Serial Port Tool : A serial communication analysis tool based on Windows PC.

- (Option) TCP&UDP Test Tool : Optional third-party PC-based network test tools are available.

6.4.2 TCP Client application Example

6.4.3   TCP Client Application Flowchart

6.4.4   TCP Client Application Description

1.Set the module to Wi-Fi mode. If it is already in the current mode, you can skip this step.

```
Send:      <<AT+ROLE=1
Response: >>OK
```

2.Connect the module to the AP hotspot.

```
Send:      <<AT+RAP=SSID,PASSWORD
Response: >>OK
```

3.To query the IP address of the module.

```
Send:      <<AT+LIP
Response: >>+LIP=192.168.0.97   //For local examples, please refer↵
↪to the actual IP address obtained by connecting to the AP
Response: >>OK
```

4.Connect the PC and the module to the same AP hotspot. Use a third-party network debugging tool on the PC to create a TCP Server.
For example, the IP address of the TCP Server is 192.168.0.79 and the port number is 8080.

5.Set the module as TCP client and configure the IP and port number of the remote TCP Server.

```
Send:      <<AT+SOCK=TCPC,9100,192.168.0.79,8080
Response: >>OK
```

6.The module acts as a TCP client to initiate the establishment of a TCP connection with the remote TCP Server.

```
Send:      <<AT+WLANC=3
Response: >>OK
```

7.After the TCP connection is successfully established, the PC-end network debugging tool will display the successful connection, as well as the data sending area and receiving area. TCP data sending and receiving can be carried out, such as sending data 1234567890 to the remote TCP Client module
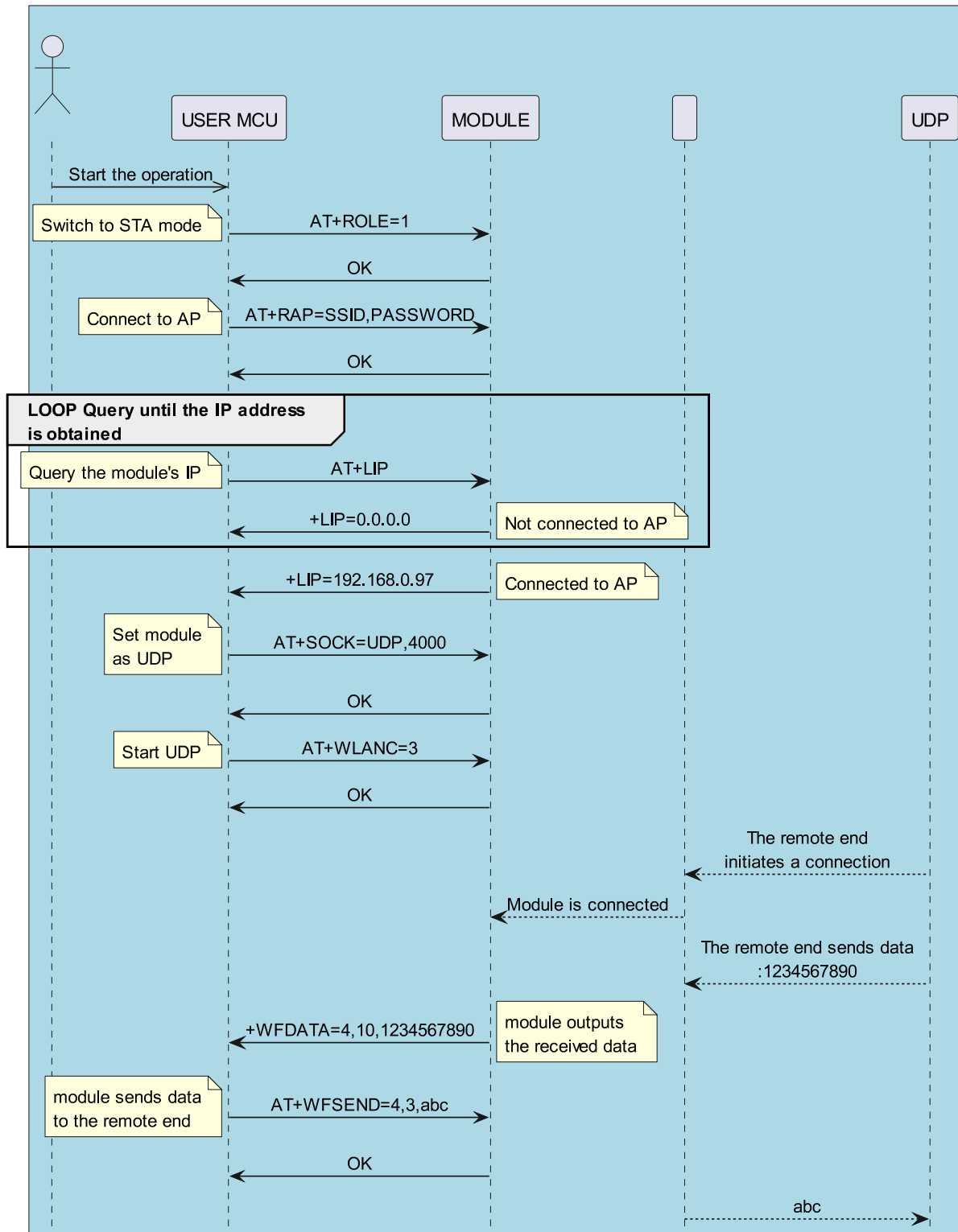
8.The module receives TCP data sent from the TCP Server. In instruction mode, an example of the received data format response is as follows:

```
Response: >>+WFDATA=3,10,1234567890
```

6.5   UDP Application

6.5.1   UDP Application Flowchart

6.5.2   UDP Application Description

1.Set the Wi-Fi mode. If you are already in the current mode, you can skip this step

---

```
Send:     <<AT+ROLE=1
Response: >>OK
```

2.Connect to AP

```
Send:     <<AT+RAP=SSID,PASSWORD
Response: >>OK
```

3.Query the IP address of the module

```
Send:     <<AT+LIP
Response: >>+LIP=192.168.0.97   //For local examples, please refer↵
↪to the actual IP address obtained by connecting to the AP
Response: >>OK
```

4.Set module as UDP

```
Send:     <<AT+SOCK=UDP,4000
Response: >>OK
```

5.Start UDP Server

```
Send:     <<AT+WLANC=3
Response: >>OK
```

6.The PC and the module are connected to the same hotspot. On the PC, a network test tool is used to start a UDP Client with the target IP 192.168.0.97 and the target port number 4000.

7.Receive data

```
Response: >>+WFDATA=4,10,1234567890
```
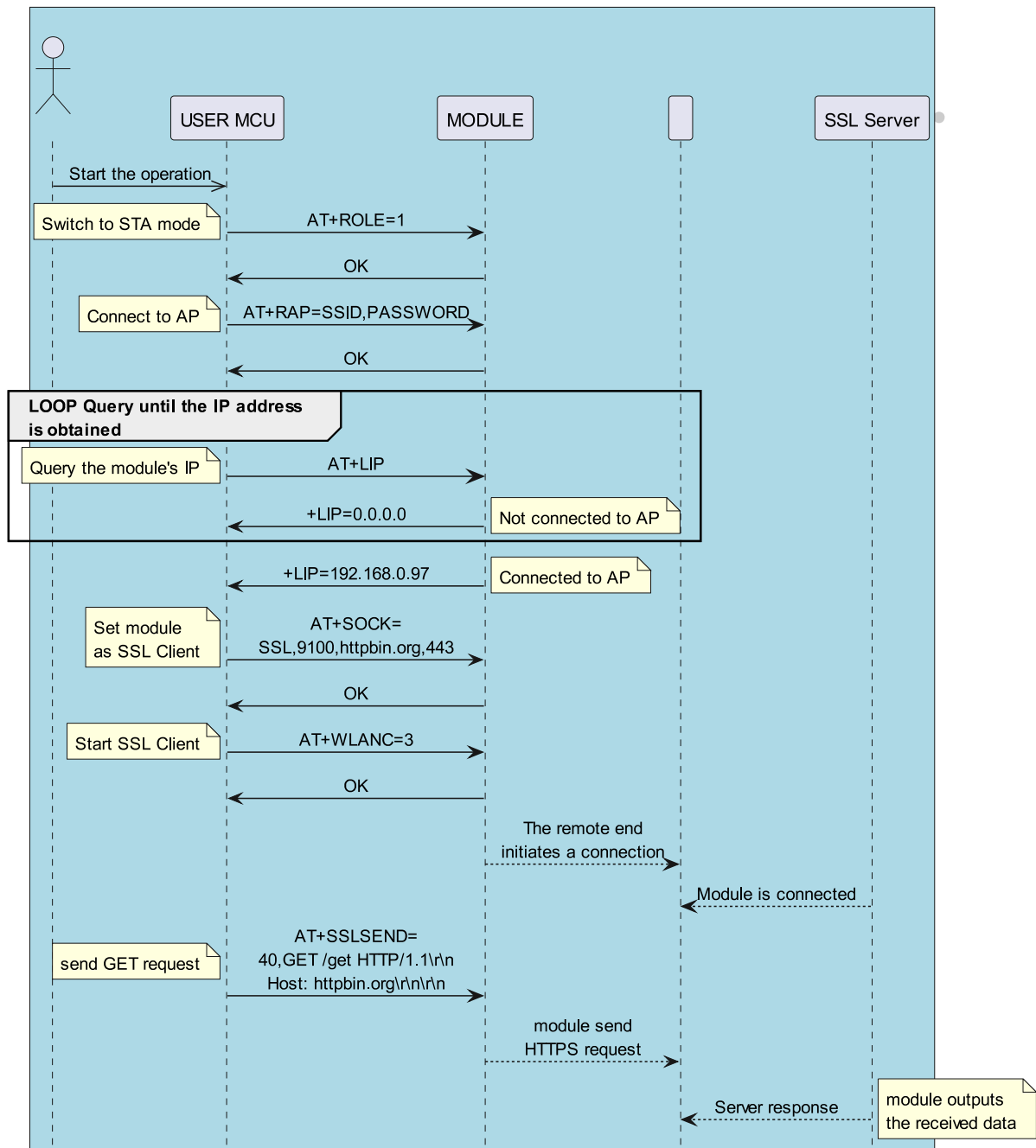
8.Send data

```
Send:     <<AT+WFSEND=4,3,abc
Response: >>OK
```

> **ℹ Note**

To use throughput mode, simply send `AT+TPMODE=1` before setting the Wi-Fi mode.

6.6 SSL Client Application

6.6.1 SSL Client Application Flowchart

6.6.2 SSL Client Application Description

1.Set the Wi-Fi mode. If you are already in the current mode, you can skip this step

```
Send:      <<AT+ROLE=1
Response: >> OK
```

2.Connect to AP

```
Send:      <<AT+RAP=ssid,password
Response: >> OK
```

3.Query the IP address of the module

```
Send:      <<AT+LIP
Response: >>+LIP=192.168.0.97   //For local examples, please refer↵
↪to the actual IP address obtained by connecting to the AP
Response: >>OK
```

4.Set the module as SSL client and configure the remote server and port number

```
Send:      <<AT+SOCK=SSL,9100,httpbin.org,443
Response: >>OK
```

5.The module initiates a connection to the remote end as an SSL client

```
Send:      <<AT+WLANC=3
Response: >> OK
```

6.Send relevant requests, such as GET requests

```
Send:      <<AT+SSLSEND=40,GET /get HTTP/1.1\\r\\nHost: httpbin.org\\
↪r\\n\\r\\n
Response: >> OK
```
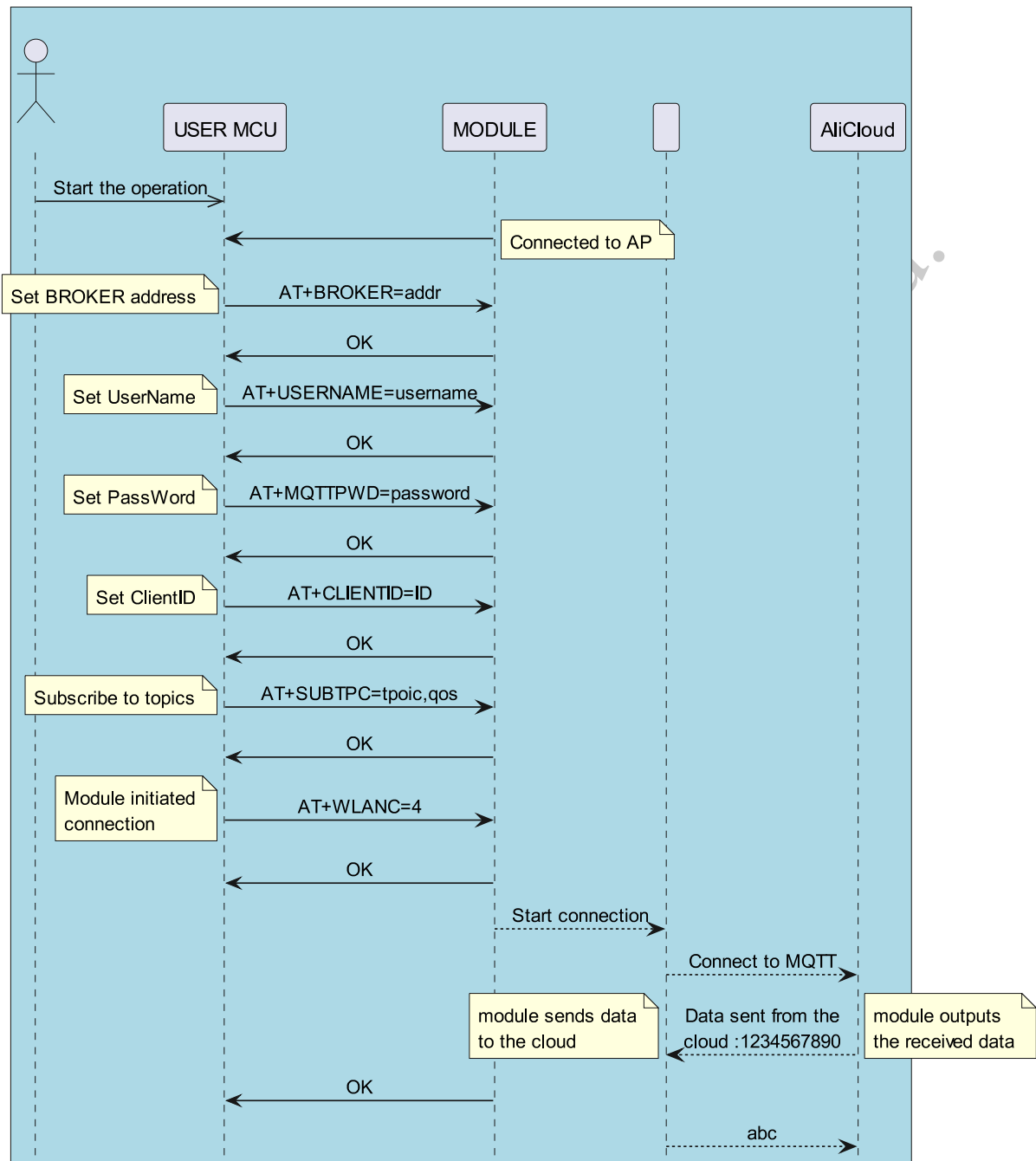
7.Receive data

```
Response: >>+SSLDATA=Specific data
```

> ℹ **Note**
>
> To use throughput mode, simply send AT+TPMODE=1 before setting the Wi-Fi mode.

6.7   MQTT Application

6.7.1   MQTT Application Flowchart

6.7.2   MQTT Application Description

1.Set the Wi-Fi mode

```
Send:     <<AT+ROLE=1
Response: >>OK
```

2.Connect to AP

```
Send:     <<AT+RAP=SSID,PASSWORD
Response: >> OK
```

3.Query the IP address of the module

```
Send:     <<AT+LIP
Response: >>+LIP=192.168.0.97   //For local examples, please refer↵
↪to the actual IP address obtained by connecting to the AP
Response: >>OK
```

4.Set the BROKER address

```
Send:     <<AT+BROKER=gpssensor.ddns.net
Response: >>OK
```

5.Set User Name

```
Send:     <<AT+USERNAME=admin
Response: >>OK
```

6.Set Password

```
Send:     <<AT+MQTTPWD=12345678
Response: >>OK
```

7.Subscribe to topics

```
Send:     <<AT+SUBTPC=user/get,0
Response: >> OK
```

8.Connect to MQTT

```
Send:     <<AT+WLANC=4
Response: >> OK
```

9.Receive the data sent by the cloud platform

```
1234567890
```

10.Send data to the cloud platform

```
Send:     <<AT+MQTTPUB=user/post,0,3,abc

Response: >>OK
```

Chapter 7

Firmware Upgrade

[中文版]

7.1　OTA Upgrade

7.1.1　OTA by AT Command

1.Switch to STA mode. If you are already in STA mode, you can omit this command.

```
Send:      <<AT+ROLE=1
Response: >>OK
```

2.Connect to AP.

```
Send:      <<AT+RAP=ssid,password
Response: >>OK
```

3.Query the IP address to determine if it is connected to the hotspot. If the IP address can be obtained, it indicates that it has been connected.

```
Send:      <<AT+LIP
Response: >>+LIP=192.168.0.87            //Example, please refer to
↪the actual reading result
```

4.Upgrade begins. The firmware name is provided by Feasycom

```
Send:      <<AT+OTA=Feasycom_test  //Example,please refer to the
↪actual firmware name. It is provided by Feasycom
Response: >>OK
Response: >>$OTA=1              //Receiving this response means the
↪upgrade has begun
```

-
-

7.1.2 FeasyBlue OTA

App Download

- FeasyBlue App

User Guide

- **Network Configuration:**

  Before performing the firmware Over-the-Air (OTA) update, network configuration is
  required. Please refer to Development Examples - Network Configuration and use the
  FeasyBlue App to complete the network configuration via the **BLE Network** function.

- **OTA Upgrade:**

  1.Run the FeasyBlue App, select **Settings** - **OTA Upgrade** from the menu bar to enter
  the OTA upgrade page.

  2.On the **OTA Upgrade page** click on **Module IP** to obtain the current IP address and
  ensure that you have been correctly connected to the network.

  3.On the **OTA Upgrade page** click on **Module version** to obtain the current module
  firmware version and confirm whether the firmware is up to date；

  4.On the **OTA Upgrade page** click on **Firmware Name** box and enter the **Firmware
  Name**（provided by Feasycom）,Click **Upgrade** ,and it will display **Firmware upgrade
  in Progress** and **Upgrade progress** prompts. This means that it has entered the upgrade
  mode；

  5.When the progress bar on the page is **100%**, and shows **Module firmware upgrade
  successfully**, OTA upgrade is completed.

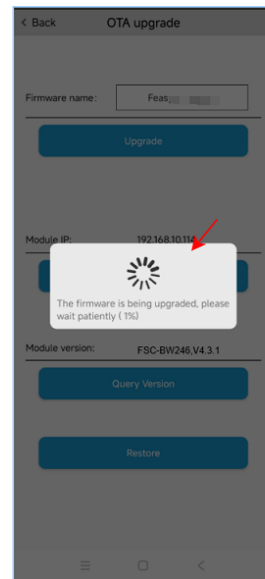- The connected AP must support internet access.
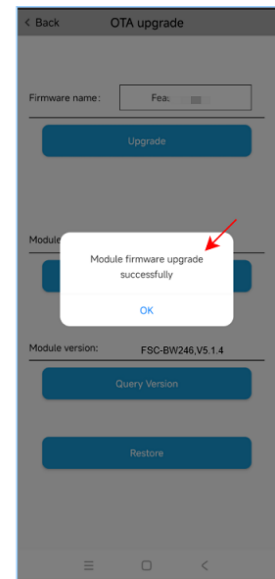
FeasyBlue OTA Show
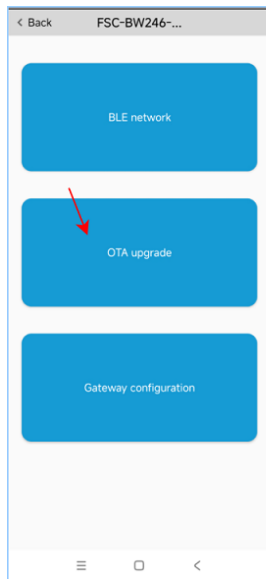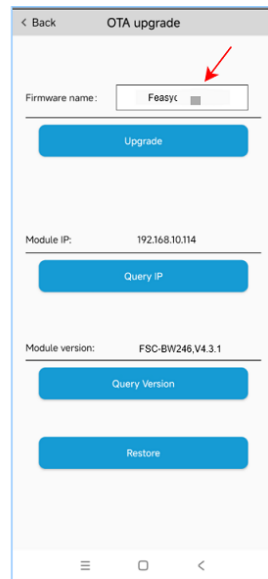
Chapter 8

Contact Information

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Chapter 9

Appendix

9.1   Download PDF

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