RAK811 & WisNode_LoRa 快速使用手册

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39 PAGES





目录

| 1. | 概述 | 3 |
|----|---------------------|------|
| 2. | AT 命令 | 3 |
| 3. | 应用实例—连接到 TTN | 5 |
| | 3.1 OTAA 方式入网 | 9 |
| | 3.2 ABP 模式入网 | . 14 |
| 4. | 应用实例—连接到 LoRaServer | . 20 |
| | 4.1 OTAA 方式入网 | 24 |
| | 4.2 ABP 模式入网 | . 30 |
| 5. | 升级固件 | 35 |
| 6. | 修订历史 | 39 |
| 7. | 文档概要 | 39 |



1. 概述

本文档适用于我司 WisNode-LoRa 和 RAK811 产品。主要介绍了该模块 AT 命令的使

用,如何连接到TTN或者LoRaServer、如何升级模块等。

2. AT 命令

您可以通过从 PC 上运行的串行端口工具向 WisNode-LoRa 模块发送 AT 命令来配置模 块。

推荐使用我司提供的串口工具:

http://docs.rakwireless.com/en/LoRa/RAK811/Tools/RAK SERIAL PORT TOOL V1. 2.1.zip

打开串口工具,选择正确的 COM 端口,波特率为 115200,然后按一下 WisNode 板子

上的 Reset 按键,串口 log 如下图所示。



AT 命令如下表所示。

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| AT 命令 | 描述 |
|---------------------------------|---|
| at+version | 查看当前的固件版本号 |
| at+get_config=device:status | 返回设备当前状态的所有信息 |
| at+set_config=device:restart | 重启设备 |
| at+set_config=device:boot | 使设备进入 boot 工作模式 |
| at+run | 仅在 boot 模式下有效 , 切换 boot 模式到正常工作模 |
| | 式 |
| at+set_config=device:sleep:X | 使设备进入休眠模式/唤醒设备 |
| | X:0:休眠,1:唤醒 |
| at+join | LoRa 节点入网 |
| at+send=lora:X:YYY | 发送自定义数据 |
| | X : LoRa 端口 |
| | YYY:要发送的数据。最大为 50 字节,数据必须为十 |
| | 六进制格式。 |
| at+set_config=lora:work_mode:X | 设置 LoRa 工作模式 |
| | X : 0: LoRaWAN, 1: LoRaP2P, 2: Test Mode. |
| at+set_config=lora:join_mode:X | 设置 LoRaWAN 入网模式 |
| | X : 0: OTAA, 1: ABP |
| at+set_config=lora:class:X | 设置 LoRa class. |
| | X : 0: Class A, 1: Class B, 2: Class C |
| at+set_config=lora:region:XXX | 设置工作频段 |
| | XXX:可以设置以下频段: |
| | EU868 EU433, CN470, IN865, EU868, AU915, |
| | US915, KR920, AS923. |
| at+set_config=lora:confirm:X | 设置 LoRa 数据类型 |
| | X : 0: unconfirm, 1: confirm |
| at+set_config=lora:dev_eui:XXXX | 设置 device EUI 用于 OTAA. |
| | XXXX:表示 device EUI. |

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| at+set_config=lora:app_eui:XXXX | 设置 application EUI 用于 OTAA. |
|----------------------------------|---|
| | XXXX:表示 application EUI. |
| at+set_config=lora:app_key:XXXX | 设置 application key 用于 OTAA. |
| | XXXX:表示 application key. |
| at+set_config=lora:dev_addr:XXXX | 设置 device address 用于 ABP. |
| | XXXX:表示 device address. |
| at+set_config=lora:apps_key:XXXX | 设置 application session key 用于 ABP. |
| | XXXX:表示 application session key. |
| at+set_config=lora:nwks_key:XXXX | 设置 network session key 用于 ABP. |
| | XXXX:表示 network session key. |
| at+set_config=lora:ch_mask:X:Y | 打开或关闭某个信道 |
| | X:表示某个信道,请在设置前检查可设置的信道 |
| | Y : 0: off, 1: on |
| at+get_config=lora:status | 返回 LoRa 所有当前信息,除了 LoRa 信道 |
| at+get_config=lora:channel | 返回所有 LoRa 信道的状态 , 您可以清楚地知道哪些信 道是关闭状态 , 哪些是打开状态 |

3. 应用实例—连接到 TTN

在本节中,我们将做一些练习来演示如何将 WisNode-LoRa 模块连接到 TTN。首先, 将模块通过 USB 连接到您的 PC 上, 然后打开 PC 上的串口工具。如下图所示打开串 \Box .





| RAK | 端口: | COM5 | | 115200 | - | 开启 |
|-------------|------|------|---------------------|--------|----|----------|
| 妾收窗口 | | | | | 清空 | <u> </u> |
| | | | | | | |
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| | | | | | | |
| 影響口(男子の | 洋同生) | | | | | |
| | | | | | | |
| | | | | | | 发送 |
| | | | | | | |

在本文档中,我们假设您已正确连接了带有 TTN 的 LoRa 网关。如果没有,请查看对 应网关的文档。登录 TTN<u>https://www.thethingsnetwork.org/</u>,进入 "Console" 页面如 下图所示。

| CONSOLE | Applications | Gateways | Support | A fomi |
|--|---------------------------------|----------|---------|--------|
| | | | | |
| Welcome to The Things Network Console. This is where the magic happens. Here you can work with your data. Register applications, devices and collaborators and settings. | i gateways, manage your integra | itions, | | |
| APPLICATIONS | GATEWAYS | | | |

进入"APPLICATIONS"页面

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| THE THINGS CONS | OLE NITY EDITION | | Applications | Gateways | Support | A fomi |
|-----------------|---------------------|---|--------------|-----------------|---------|--------|
| | Applications | | | | | |
| | | | | | | |
| | APPLICATIONS | | 0 | add application | | |
| | | You do not have any applications. Get started by adding one! | | | | |

点击"add application"添加应用

| THETHINGS CONSOLE COMMUNITY EDITION | Applications | Gateways | Support | A fomi |
|--|--------------|----------|---------|--------|
| Applications > Add Application | | | | |
| ADD APPLICATION | | | | |
| Application ID The unique identifier of your application on the network | | | | |
| Description A human readable description of your new app | | | | |
| Eg. My sensor network application | | 0 | | |
| Application EUI An application EUI will be issued for The Things Network block for convenience, you can add your own in the application settings page | k. | | | |
| EUI issued by The Things Network | | | | |
| Handler registration Select the handler you want to register this application to | | | | |
| ttn-handler-eu | | 0 | | |

根据页面提示填写内容(其中您在"Application ID"项中填写的内容应为小写,并且必须

是 TTN 网络上的唯一 ID)

| | LE TY EDITION | Applications | Gateways | Support | 🎮 fomi |
|-----|---|--------------|----------------|---------|--------|
| Арр | lications > Add Application | | | | |
| A | DD APPLICATION | | | | |
| | Application ID The unique identifier of your application on the network | | | | |
| | rak811wisnodelora | | 0 | | |
| | Description A human readable description of your new app | | | | |
| | Test RAK811 LoRa Node | | 0 | | |
| | Application EUI An application EUI will be issued for The Things Network block for convenience, you can add your own in the application settings page. | | | | |
| | EUI issued by The Things Network | | | | |
| | Handler registration Select the handler you want to register this application to | | | | |
| | ttn-handler-eu | | 0 | | |
| | | | | | |
| | c | Cancel A | ld application | | |
| | | | | | |

点击 "Add application" ,应用添加成功如下图所示。



| SOLE | | Applications | Gateways | Support | \Lambda fomi |
|---|----------------------|-----------------|---------------|---------|--------------|
| Applications > 🥪 rak811wisnodelora | | | | | |
| APPLICATION OVERVIEW | | | | | |
| Application ID rak811wisnodelora Description Test RAK811LoRa Node Created 13 seconds ago Handler ttn-handler-eu (current handler) | | | documentatio | n | |
| | | | | | |
| APPLICATION EUIS | | | manage eui | 5 | |
| ↔ ≒ 70 B3 D5 7E D0 01 E2 62 图 | | | | | |
| | | | | | |
| DEVICES | c. | register device | manage device | 5 | |
| | 0 registered devices | | | | |

接下来进入"DEVICES"页面,开始添加设备。

| DEVICES | | 👴 register device 🛛 🔅 manage devices |
|---------|----------------------|--------------------------------------|
| | 0 registered devices | |

其中"Device EUI"可以选择由 TTN 自动生成的 (需要将节点设备的 Device EUI 设置成

| THE THINGS CO | NSOLE MUNITY EDITION | Applications | Gateways | Support | of fomi |
|---------------|---|--------------|-------------------|---------|---------|
| | Applications > 🛞 rak811wisnodelora > Devices | | | | |
| | REGISTER DEVICE | 1 | ulk import device | es | |
| | Device ID This is the unique identifier for the device in this app. The device ID will be immutable. | | | | |
| | Device EUI The device EUI is the unique identifier for this device on the network. You can change the EUI later. | | | | |
| | App Key The App Key will be used to secure the communication between you device and the network. | | | | |
| | this field will be generated | | | | |
| | App EUI | | | | |
| | 70 B3 D5 7E D0 01 E2 62 | | 0 | | |
| | | | | | |
| | | Cancel | Register | | |

此 EUI) , 或者选择手动输入节点设备的 Device EUI。

TTN 自动生成 Device EUI 如下图所示。

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|------------|---|
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| | OLE NITY EDITION | | Applications | Gateways | Support | A fomi |
|---|---|---|--------------|----------|---------|--------|
| 2 | Applications > 😂 rak811wisnodelora > Device | 35 | | | | |
| | Device ID This is the unique identifier for the device in this a | pp. The device ID will be immutable. | | | | |
| | 000111222333000 | | | 0 | | |
| | Device EUI The device EUI is the unique identifier for this dev | ice on the network. You can change the EUI later. | | | | |
| | 1 | this field will be generated | | | | |
| | App Key The App Key will be used to secure the communic | ation between you device and the network. | | | | |
| | 1 | this field will be generated | | | | |
| | App EUI | | | | | |
| | 70 B3 D5 7E D0 01 E2 62 | | | ٥ | | |
| | | | | | | |
| | | | Cancel | Register | | |

然后点击"Register",添加成功如下图所示。

| CONSOLE COMMUNITY EDITION | | | | | | | Applications | Gateways | Support | A fomi |
|------------------------------|------------|--------|----------------------|---------|----|---|--------------|----------|---------|--------|
| Applications > 🥪 rak811wisno | delora > | Dev | ces > 🐑 0001112 | 223330 | 00 | | | | | |
| DEVICE OVERVIEW | | | | | | | | | | |
| Application ID | rak811v | wisnoc | lelora | | | | | | | |
| Device ID | 00011122 | 22333 | 000 | | | | | | | |
| Activation Method | OTAA | | | | | | | | | |
| Device EUI | | 00 | CA 9C 70 87 76 2F 71 | Ē | | | | | | |
| Application EUI | ↔ ≒ | 70 | B3 D5 7E D0 01 E2 62 | Ē | | | | | | |
| Арр Кеу | o = | ۲ | | ·· ·· · | | Ē | | | | |
| Status | never s | een | | | | | | | | |
| Frames up | 0 reset fr | ame co | ounters | | | | | | | |
| Frames down | 0 | | | | | | | | | |

3.1 OTAA 方式入网

正如在上图所示的页面中看到的,默认的激活方法是 OTAA。下图所示的三个参数将用

于 WisNode-LoRa 模块。



V3.0.0.0.0



| ISOLE MUNITY EDITION | | | | | Applications | Gateways | Support | \Lambda fomi |
|---|--|--|----------|---|--------------|----------|---------|--------------|
| Applications > 🧼 rak811wisnoo | delora > | Devices > 7 0001112 | 22333000 | | | | | |
| DEVICE OVERVIEW | | | | | | | | |
| Application ID Device ID (Activation Method Device EUI Application EUI App Key Status Frames up (| rak811v 00011122 OTAA <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = <> = | #snodelora 2333000 Ø0 CA 9C 70 87 76 2F 71 70 B3 D5 7E D0 01 E2 62 Image: Counters | | Ð | | | | |
| Frames down | 0 | | | | | | | |

默认的 LoRa 工作模式为 LoRaWAN 1.0.2, 默认的 LoRa 连接模式为 OTAA, 默认使用

LoRa class A。此处我们已 EU868 频段为例说明。

如果当前的 join mode 不是 OTAA,只需将 join mode 设置为 OTAA,如下所示:



设置 LoRa class 为 Class A:



-----RAK811 version:3.0.0.0.H ********** ----Selected LoRaWAN 1.0.2 Region: AU915 LoRa Initialization OK. >>at+set_config=lora:join_mode:0 OK >>at+set_config=lora:class:0 ок 发送窗口(默认发送回车) at+set_config=lora:class:0 发送

设置频段为 EU868:



设置 Device EUI:



| | ^ |
|---|---|
| *********************** | |
| RAK811 version:3.0.0.0.H | |
| ***************** | |
| | |
| | |
| Selected LoRaWAN 1.0.2 Region: EU868 | |
| LoRa Initialization OK. | |
| >>at+set_config=lora:region:EU868 | |
| No switch region.Current region:EU868 | |
| ок | |
| >>at+set_config=lora:dev_eui:00CA9C7087762F71 | |
| ок | |
| | v |
| 发送窗口(默认发送回车) | |
| at+set_config=lora:dev_eui:00CA9C7087762F71 | |
| 发送 | |
| | |

设置 Application EUI:



设置 Application Key:



^

| Selected LoRaWAN 1.0.2 Region: EU868 | |
|---|-------|
| LoRa Initialization OK. | |
| >>at+set_config=lora:region:EU868 | |
| No switch region.Current region:EU868 | |
| ок | |
| >>at+set_config=lora:dev_eui:00CA9C7087762F71 | |
| ок | - 11 |
| >>at+set_config=lora:app_eui:70B3D57ED001E262 | |
| ок | |
| >> | |
| at+set_config=lora:app_key:C85E8499381501391B772739370 | 81472 |
| C | |
| ок | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at +set_config=lora:app_key:C85E8499381501391B7727393 781472C | 发送 |

开始 OTAA 入网:

| OTAA: | |
|---|----|
| DevEui:00CA9C7087762F71 | |
| AppEui:70B3D57ED001E262 | |
| AppKey:E1A21BF51654D0D353EA45DAD465185A | |
| OTAA Join Start | |
| OK | |
| [LoRa]:Joined Successed! | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| ' 发送窗口(默认发送回车) | |
| at+join | |
| | 发送 |
| | |

如上图所示,入网成功。接下来我们来发送数据到 TTN。



| OTAA: | |
|---|----|
| DevEui:00CA9C7087762F71 | |
| AppEui:70B3D57ED001E262 | |
| AppKey:E1A21BF51654D0D353EA45DAD465185A | |
| OTAA Join Start | |
| ок | |
| [LoRa]:Joined Successed! | |
| ок | |
| [LoRa]: Confirm data send OK | |
| 发送窗口(默认发送回车) | |
| at+send=lora:2:12345678 | 发送 |

可以看到 TTN 已经收到刚刚发送的数据,如下图所示。

| THE THINGS CONSOLE | ITION | | | | | | | | Applicatio | ns Gat | teways | Support | 内 fomi |
|--------------------|------------------|------------|-------------|---------------|----------------|------------------|--------------------|------------------|------------------|--------|----------|---------|--------|
| Applicati | ons > 🤘 r | ak811wisno | delora > D | Devices > 🐖 | 0001112 | 22333000 > Da | ta | | | | | | |
| | | | | | | | | | Overview | Data | Settings | | |
| APPI | APPLICATION DATA | | | | | | | II paus | e 🗑 <u>clear</u> | | | | |
| Filte | uplink | downlink | activation | ack | error | | | | | | | | |
| | time | counter | port | | | | | | | | | | |
| | 17:15:07 | | 0 | | | | | | | | | | |
| * | 17:15:07 | 0 | 2 co | infirmed payl | oad: 12 34 56 | 78 | | | | | | | |
| + | 17:13:58 | | | dev | addr: 26 01 20 | 78 app eui: 70 B | 3 D5 7E D0 01 E2 6 | 2 deveui: 00CA9C | 70 87 76 2F 7 | 1 | | | |

Great! That's all about OTAA mode.

3.2 ABP 模式入网

下面介绍 ABP 的入网方式,首先需要将 activation method 设置为 ABP,如下图所示。



| | CONSOLE | Applications Gateways Suppo | t O for |
|------------|---|--|----------|
| | Applications > 🤤 rak811wisnodelora | > Devices > 💼 000111222333000 > Settings | |
| | | Overview Data Settings | |
| | | | |
| | DEVICE SETTINGS | SETTINGS | |
| | General | Description | |
| | Location | A human-readable description of the device | |
| | | | |
| | | Device EUI The serial number of your radio module, similar to a MAC address | |
| | | ∞ 00 CA 9C 70 87 76 2F 71 ⊗ 8 bytes | |
| | | Application EUI | |
| | | 70B3D57ED001E262 0 | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | App Key The key your device will use to set up sessions with the network | |
| | | App Key The key your device will use to set up sessions with the network | |
| THE THING | S CONSOLE | App Key The key your device will use to set up sessions with the network Applications Gateways Suppo | rt 👩 for |
| THE THING | S CONSOLE COMMUNITY EDITION Applications > 📦 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > 000111222333000 > Settings | rt 🍳 for |
| THE THING | S CONSOLE COMMUNITY EDITION Applications > 😂 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > 000111222333000 > Settings Settings Support Device EUI The serial number of your radio module, similar to a MAC address Support Support | rt 闪 for |
| THE THING | S CONSOLE COMMUNITY EDITION Applications > 🛞 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > 🐑 000111222333000 > Settings Settings Support Support Device EUI The serial number of your radio module, similar to a MAC address x 00 CA 9C 70 87 76 2F 71 Bitween Bitween | nt 🍋 for |
| THE THING | S CONSOLE COMMUNITY EDITION Applications > 📦 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > © 000111222333000 > Settings Device EUI The serial number of your radio module, similar to a MAC address • Bore x 00 CA 9C 70 87 76 2F 71 • Bore Application EUI • Bore | rt 🔘 for |
| THE THING | S CONSOLE COMMUNITY EDITION Applications > lege rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > 000111222333000 > Settings Perice EUI The serial number of your radio module, similar to a MAC address a: 00 CA 9C 70 87 76 2F 71 B totes Application EUI 7083057ED001E2.62 0 | rt 🔘 fo |
| THE THING | S CONSOLE COMMUNIT EDITION Applications > 🞯 rak811wisnodelora | App Key The keyyour device will use to set up sessions with the network Applications Gateways Support Devices > 💼 000111222333000 > Settings Devices > 💼 000111222333000 > Settings Devices > 💼 000111222333000 > Settings Application EUI 7083057ED001E262 • Bore | rt 🔘 for |
| THE THING | S CONSOLE COMMUNITY EDITION Applications > 📦 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > 00111222333000 > Settings Device EUI The serial number of your radio module, similar to a MAC address: x 00 CA 9C 70 87 76 2F 71 • Bores Application EUI 70 B3D57ED001E262 • Contemport | rt 🔘 for |
| THE THING | § CONSOLE ★ COMMUNITY EDITION Applications > | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > 00111222333000 > Settings Devices > 00111222333000 > Settings Device EUI The serial number of your radio module, similar to a MAC address 00 CA 9C 70 87 76 2F 71 0 8 bytes 0 0 0 3005 7E D001 E2 62 0 Activation Method OTAA ABP | rt 🗚 for |
| | S CONSOLE COMMUNITY EDITION Applications > 🔘 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Gateways Support > Devices > (****) 000111222333000 > Settings Pervice EUI The serial number of your radio module, similar to a MAC address ************************************ | rt 🗚 for |
| THE THING: | S CONSOLE COMMUNITY EDITION Applications > 📦 rak811wisnodelora | App Key The keryyour device will use to set up sessions with the network Applications Gateways Support Devices > 00111222333000 > Settings Device > 00111222333000 > Settings Perice EUI The serial number of your radio module, similar to a MAC address 00 CA 9C 70 87 76 2F 71 00 revice 00 revice EUI The device address will be assigned by the network server | rt 🍳 tor |
| THE THING | S CONSULT EDITION Applications > 🛞 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Applications Cateways > Devices > Cateways Ocitations Device EUI The serial number of your radio module, similar to a MAC address: 0 CA 9C 70 87 76 2F 71 Borss Application EUI 7083057ED001E262 OttA ABP Device Address The device address will be assigned by the network server Network Session Key | rt 💽 for |
| THE THING | S CONSOLE COMMUNITY EDITION Applications > | App Key The key your device will use to set up sessions with the network Application Gateways Specice Device Device Image: Specice Device Devic | rt 🕰 foi |
| THE THING | S CONSULE COMMUNITY EDITION Applications > 🛞 rak811wisnodelora | App Key The key your device will use to set up sessions with the network Application & Gateway & Support Device > 0011122233300 > Settings Device EUI The serial number of your radio module, similar to a MAC address a 00 CA 9C 70 87 76 2F 71 Application EUI 70 83D57E D001 E2 62 Device Address The device address will be assigned by the network server Network Session Key Network Session Key | rt 🍳 tor |

下图所示的三个参数将用于 WisNode_LoRa 模块。



| THE THINGS CONSOLE COMMUNITY EDITION | | Applications | Gateways | Support | A fomi |
|---|--------------------------------------|--------------|----------|---------|--------|
| Applications > 🤤 rak811wisno | delora > Devices > 🐑 000111222333000 | | | | |
| DEVICE OVERVIEW | | | | | |
| Application ID | rak811wisnodelora | | | | |
| Device ID | 000111222333000 | | | | |
| Activation Method | ABP | | | | |
| Device EUI | ↔ = 00 CA 9C 70 87 76 2F 71 (2) | | | | |
| Application EUI | ↔ ≒ 70 B3 D5 7E D0 01 E2 62 [] | | | | |
| Device Address | ↔ = 26 01 10 0F E | | | | |
| Network Session Key | ↔ = | | | | |
| App Session Key | 0 ± • ····· B | | | | |
| Status Frames up Frames down | 4 days ago 0 reset frame counters 0 | | | | |

此处我们已 EU868 频段为例,开始使用 ABP mode 入网。

如果当前的 join mode 不是 ABP,只需将 join mode 设置为 ABP,如下所示:

| | ^ |
|---|---|
| | |
| | |
| *************************************** | |
| RAK811 version:3.0.0.0.H | |
| ********** | |
| | |
| | |
| Selected LoRaWAN 1.0.2 Region: US915 | |
| LoRa Initialization OK. | |
| >>at+set_config=lora:join_mode:1 | |
| ок | |
| | ¥ |
| 发送窗口(默认发送回车) | |
| at+set_config=lora:join_mode:1 | |
| 发送 | |

设置 LoRa class 为 Class A:





设置频段为 EU868:



设置 dev_addr:



| >>at+set_config=lora:dev_addr:2601100F | |
|--|----|
| ок | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| 发送窗口(默认发送回车) | |
| at+set_config=lora:dev_addr:2601100F | |
| | 发送 |
| | |

设置 nwks_key:

| >>at+set_config=lora:dev_addr:2601100F |
|--|
| OK |
| >> |
| at+set_config=lora:nwks_key:5CAE46002AC3A799764A6F511575A4DE |
| ок |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| 支送窗口(默认发送回车) |
| at +set_config=lora:nwks_key:5CAE46002AC3A799764A6F51 发送 |
| TJ7 JA4UE |

设置 apps_key:



| >>at+set_config=lora:dev_addr:2601100F |
|--|
| ок |
| >> |
| at+set_config=lora:nwks_key:5CAE46002AC3A799764A6F511575A4DE |
| ок |
| >> |
| at+set_config=lora:apps_key:4A1D7677AFCF14CFF4B7AE127CDC92D9 |
| ок |
| |
| 发送窗口(默认发送回车) |
| at +set_config=lora:apps_key:4A1D7677AFCF14CFF4B7AE12 7CDC92D9 |

使用 ABP 模式入网,如下图所示。

| >>at+set_config=lora:dev_addr:2601100F |
|--|
| ок |
| >> |
| at+set_config=lora:nwks_key:5CAE46002AC3A799764A6F511575A4DE |
| ок |
| >> |
| at+set_config=lora:apps_key:4A1D7677AFCF14CFF4B7AE127CDC92D9 |
| ок |
| ABP: |
| DevEui: 3238333560385D04 |
| DevAddr: 2601100F |
| AppsKey: 4A1D7677AFCF14CFF4B7AE127CDC92D9 |
| NwksKey: 5CAE46002AC3A799764A6F511575A4DE |
| ок |
| |
| |
| 发送窗口(默认发送回车) |
| at+join 发送 |

如上图所示,入网成功。接下来我们来发送数据到 TTN。





| at+set_config=lora:nwks_key:5CAE46002AC3A799764A6F511575A4 | ^ |
|--|---|
| DE | |
| ок | |
| >> | |
| at+set_config=lora:apps_key:4A1D7677AFCF14CFF4B7AE127CDC92 | |
| D9 | |
| ок | |
| ABP: | |
| DevEui: 3238333560385D04 | |
| DevAddr: 2601100F | |
| AppsKey: 4A1D7677AFCF14CFF4B7AE127CDC92D9 | |
| NwksKey: 5CAE46002AC3A799764A6F511575A4DE | |
| ок | |
| ок | |
| [LoRa]: Unconfirm data send OK | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at+send=lora:2:1234567890 | |
| 发送 | |
| | |

可以看到 TTN 已经收到刚刚发送的数据,如下图所示。

| | SOLE | DN | | | | | | | | | Applicatio | ons Ga | teways | Support | A fomi |
|-----|--------------|----------------|------------|------------|-----------|------------|---------|-----------|--------|--|------------|--------|----------|---------|--------|
| | Applications | > 🤤 ra | k811wisnoc | ielora > D |)evices > | (<u> </u> | 000111 | 222333000 | > Data | | | | | | |
| | | | | | | | | | | | Overview | Data | Settings | | |
| APP | | PLICATION DATA | | | | | | | | | | | | | |
| | Filters | uplink | downlink | activation | ack | error | | | | | | | | | |
| | | time | counter | port | | | | | | | | | | | |
| | ▼ 16 | :12:33 | | 0 | | | | | | | | | | | |
| | 1 6 | :12:32 | 0 | 2 | retry | payload: 1 | 12 34 5 | 6 78 90 | | | | | | | |

4. 应用实例—连接到 LoRaServer

loraserver 是一个开源项目, 链接地址: <u>https://www.loraserver.io/</u>.

您可以按照以下步骤使用 Wisnode-LoRa 与 loraserver 连接:

在本文中,假设您使用的是我司 LoRa 网关及其内置的 loraserver 或我司云测试 loraserver。另外本文中假设您已经成功地用 loraserver 配置了一个 lora 网关。

如果没有,请查看对应网关的文档,去了解有关我司 LoRa 网关和云测试 loraserver 的更多详细信息。

接下来开始我们的应用实践。先打开要连接的 loraserver 的网页并登录。



| ⇔ | DoRaServer | | | Q Search organiza | ion, application, gateway or device | ? | e admin | | |
|------------------------|------------------|--------------|--------------|---------------------|-------------------------------------|---|---------|--|--|
| | Network-servers | Applications | Applications | | | | | | |
| \bigcirc | Gateway-profiles | Applications | | | | | UNLATE | | |
| # :: | Organizations | ID | Name | Service-profile | Description | | | | |
| • | All users | 1 | AnnModel | ServiceProfileModel | AppModel | | | | |
| loraserver * | | | | | Rows per page: 10 ▼ 1-1 of 1 | < | > | | |
| \$ | Org. settings | | | | | | | | |
| : | Org. users | | | | | | | | |
| ±≡ | Service-profiles | | | | | | | | |
| Ξ는 | Device-profiles | | | | | | | | |
| $\widehat{\mathbb{N}}$ | Gateways | | | | | | | | |
| | Applications | | | | | | | | |
| 2 | Multicast-groups | | | | | | | | |

默认情况下,此页中已存在一个或多个项目,您可以使用它或创建新项目。现在,让我 们通过单击"CREATE"按钮来创建一个新项目,并填写以下信息。

| | * |
|------------|------------|
| | |
| | |
| E APPLICAT | FION |
| | TE APPLICA |

| € | LoRa Server | Q. Search organization, application, gateway or device 🕑 😝 admin |
|------------|--------------------|--|
| | Network-servers | Applications / Create |
| \bigcirc | Gateway-profiles | |
| | Organizations | Application name * |
| • | All users | R4K811 The norm may only contain works numbers and dathes |
| loras | erver 👻 | Application description* Test RAK311 LoRa Node |
| \$ | Org. settings | Service profile * |
| * | Org. users | ServiceProfileModel |
| .≟≡ | Service-profiles | The service-prote to which this application will be attached. Note that you can't change this value after the application has been created. Payload codec |
| | Device-profiles | None v |
| R | Gateways | ру фелину а рајнаци совек, цона идр закте сан ексове ви синату векте рајкови на уко. |
| | Applications | CREATE APPLICATION |
| 2 | Multicast-groups | |

点击"CREATE APPLICATION".



| € | LoRa Server | | | (| ${f Q}$ Search organization, application, gateway or device | ? | 😫 admin |
|--------------|--------------------|--------------|----------|---------------------|---|----------|---------|
| | Network-servers | Applications | | | | | |
| R | Gateway-profiles | Applications | | | | | UNLERIE |
| | Organizations | ID | Name | Service-profile | Description | | |
| • | All users | τ | AppModel | ServiceProfileModel | AppModel | | |
| loraserver 👻 | | 2 | RAK811 | ServiceProfileModel | Test RAK811 LoRa Node | | |
| \$ | Org. settings | | | | Rows per page: 10▼ | 1-2 of 2 | ~ > |
| • | Org. users | | | | | | |
| ±≡ | Service-profiles | | | | | | |
| | Device-profiles | | | | | | |
| R | Gateways | | | | | | |
| | Applications | | | | | | |
| 2 | Multicast-groups | | | | | | |

进入新创建的"RAK811"项目:

| ∉ | LoRa Server | | | | | Q Search organization, applicat | ion, gateway or device | | ? | admin |
|--------------|-------------------------------------|-------------------|---------------------------|--------------|------------|---------------------------------|------------------------|----------|---|--------|
| | Network-servers Gateway-profiles | Applications / RA | \K811 | | | | Ĩ | DELETE | | |
| | Organizations | DEVICES | APPLICATION CONFIGURATION | INTEGRATIONS | | | | | | |
| - | All users | | | | | | | | + | CREATE |
| loraserver 👻 | | | | | | | | | | |
| ¢ | Org. settings | Last seen | Device name | | Device EUI | Link margin | | Battery | | |
| • | Org. users | | | | | | Rows per page: 10* | 0-0 of 0 | < | > |
| ±≡ | Service-profiles | | | | | | | | | |
| | Device-profiles | | | | | | | | | |
| R | Gateways | | | | | | | | | |
| | Applications | | | | | | | | | |
| 2 | Multicast-groups | | | | | | | | | |

单击"CREATE"按钮,将 lora 节点设备添加到 loraserver 中:

| € | LoRaServer | | | | Q Search organization, application | , gateway or device | 0 | θ | admin |
|--|--|-------------------|------------------------------------|-------------|------------------------------------|---------------------|----------|------|-------|
| •••••••••••••••••••••••••••••••••••••• | Network-servers Gateway-profiles Organizations | Applications / RA | AK811 APPLICATION CONFIGURATION | NTEGRATIONS | | | | i D | ELETE |
| . | All users | | | | | | | + ci | REATE |
| loraserver 👻 | | | | | | | _ | | |
| \$ | Org. settings | Last seen | Device name | Device EUI | Link margin | | Battery | | |
| • | Org. users | | | | | Rows per page: 10▼ | 0-0 of 0 | < | > |
| <u>.</u> ≡ | Service-profiles | | | | | | | | |
| 코는 | Device-profiles | | | | | | | | |
| R | Gateways | | | | | | | | |
| | Applications | | | | | | | | |
| 2 | Multicast-groups | | | | | | | | |

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| € | C LoRaServer | Q Search organization, application, gateway or device | 0 | 🖰 admi | In |
|-----------------|--|--|-------|----------|----|
| • ® | Network-servers Gateway-profiles Organizations | Applications / RAK811 / Devices / Create | | | |
| • | All users | Device name * The name may only contain words, numbers and dashes. | | | |
| loras | server 👻 | Device description * | | | _ |
| • | Org. users | Device EUI* | MSE | C | |
| | Service-profiles Device-profiles | Device-profile* Device-profile | | × | |
| R | Gateways | Disable frame-counter validation Disable frame-counter validation Uncertainty of the second s | | | |
| <i>ت</i> ا ا | Applications Multicast-groups | teres consistenting the metric solution remotered in the temperature because youngs or perform regardly MIRAND. | CREAT | E DEVICE | |

您可以通过单击以下图标自动生成设备 eui,也可以在编辑框中写入正确的设备 eui。

| € | DoRa Server | Q Search organization, application, gateway or device | 0 | eutest005 |
|---|---|---|------|-----------|
| test0 • • ■ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ | ofg. users Service-profiles Device-profiles Gateways Applications Multicast-groups | Applications / RAK811 / Devices / Create Device name * RAK811_LoRaNode The name may only contain words, numbers and dashes. Device decryption * RAK811 LoRa Node for testing Device EUI* Se 9d 1e 08 57 cf 25 f1 Device profile* Device profile | MS | в С |
| | | DeviceProfile_ABP DeviceProfile_OTAA | CREA | TE DEVICE |

注意:如果使用 OTAA 模式,应在"Device-profile"项中选择"**DeviceProfile_OTAA**"。 如果要使用 ABP 模式和 CN470 频率,应在"Device-profile"项中选择 "**DeviceProfile_ABP_CN470**"。如果要使用 ABP 模式和除 AS923 和 CN470 以外的其 他频率,应在"Device-profile"项中选择"**DeviceProfile_ABP**"。ABP 模式下的 AS923 怎么样?对不起的! LoRaServer 现在无法支持它。



4.1 OTAA 方式入网

选择"DeviceProfile_OTAA",如下图所示。

| | C LoRaServer | | ? | θ | eutest005 |
|------------|------------------|---|----|-------|-----------|
| test | 005 - | ter lie alore / DAVOID / Device / Orest | | | |
| ÷ | Org. users | Applications / KAK811 / Devices / Create | | | |
| ≟ ≡ | Service-profiles | Device name * | | | |
| 규는 | Device-profiles | RAK811_LORaNode | | | |
| R | Gateways | The name may only comain words, numbers and dashes. Device description * | | | |
| m | Applications | RAK811 LoRa Node for testing | | | |
| 2 | Multicast-groups | Device EUI * 5e 9d 1e 08 57 cf 25 f1 | | MSB | C |
| | | DeviceProfile_OTAA | | | • |
| | | Disable frame-counter validation | | | |
| | | Note that disabling the frame-counter validation will compromise security as it enables people to perform replay-attacks. | | | |
| | | | CR | REATE | EVICE |

点击"CREATE DEVICE", 然后在此页面中生成应用程序密钥。您可以自己编写或通过 单击以下图标自动生成:

| € | LoRa Server | Q. Search organization, application, gateway or device | ? 😑 eutest005 |
|------------|--------------------|---|-----------------|
| test0 | 05 👻 | Applications / RAK811 / Devices / RAK811 / oRaNode | DELETE |
| • | Org. users | | |
| ≞ ≡ | Service-profiles | DETAILS CONFIGURATION KEYS (OTAA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES | |
| 25 | Device-profiles | | |
| R | Gateways | Application key (LoRaWAN 1.0) * f9 21 d5 0c d7 d0 2e e3 c5 e6 14 21 54 f2 74 b2 | MSB C 🐼 |
| | Applications | For LoRaWAN 1.0 devices, this is the only key you need to set. In case your device supports LoRaWAN 1.1, update the device-profile first. | |
| 2 | Multicast-groups | | SET DEVICE-KEYS |

点击"SET DEVICE-KEYS"。到此您已经在 loraserver 上完成了配置。

| € | LoRa Server | | | | | ? eutest005 |
|------------|--------------------|-------------------|---------------------------|------------------|---------------------|---------------|
| test | 005 👻 | Applications / PA | K811 | | | DELETE |
| • | Org. users | Applications / KA | | | | PLLIL |
| ≛ ≡ | Service-profiles | DEVICES | APPLICATION CONFIGURATION | INTEGRATIONS | | |
| | Device-profiles | | | | | + CREATE |
| R | Gateways | | | | | |
| | Applications | Last seen | Device name | Device EUI | Link margin | Battery |
| 9 | Multicast-groups | n/a | RAK811_LoRaNode | 5e9d1e0857cf25f1 | n/a | n/a |
| | | | | | Rows per page: 10 ▼ | 1-1 of 1 < > |

然后需要设置 WisNode-LoRa 的设备 eui 为 "dev_eui":

然后需要设置 WisNode-LoRa 的 Application Key 为 "app_key" :



| € | DoRaServer | Q Search organization, application, gateway or device | ? | θ | eutest005 |
|------------|------------------|---|-----|-------|-----------|
| test0 | 05 👻 | Applications / RAK811 / Devices / RAK811 DRANde | | | DELETE |
| • | Org. users | | | - | |
| ≞ ≡ | Service-profiles | DETAILS CONFIGURATION KEYS (OTAA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES | | | |
| 24 | Device-profiles | | | | |
| R | Gateways | Application key (LoRaWAN 1.0)* 19 21 d5 0c d7 d0 2e e3 c5 e6 14 21 54 f2 74 b2 | MSB | C | 8 |
| | Applications | For LoRaWAN 1.0 devices, this is the only key you need to set. In case your device supports LoRaWAN 1.1, update the device-profile first. | | | |
| 2 | Multicast-groups | | SET | DEVIC | E-KEYS |
| | | | | | |

对于 WisNode-LoRa 需要设置的 Application EUI 即"app-eui"对 loraserver 无效,您可以将其设置为具有正确格式的任何值,即使您可以将值设置为与 dev-eui 相同。

接下来,需要使用 at 命令来配置模块。

将模块通过 USB 连接到您的 PC 上, 然后打开 PC 上的串口工具。

| | ^ |
|--------------------------------------|---|
| | |
| ******* | |
| RAK811 version:3.0.0.0.H | |
| ********* | |
| | |
| | |
| Selected LoRaWAN 1.0.2 Region: AU915 | |
| LoRa Initialization OK. | |
| | ~ |
| 友话窗山(默认友话回车) | |
| 发送 | |
| | |

默认的 lora 工作模式为 lorawan 1.0.2, 默认的连接模式为 OTAA。

如果现在加入模式不是 OTAA, 重新设置即可, 如下图所示。





| ======================================= | |
|---|---|
| *********************** | |
| | |
| RAK811 version:3.0.0.0.H | |
| ***************** | |
| | |
| | |
| Selected LoRaWAN 1.0.2 Region: AU915 | |
| LoRa Initialization OK. | |
| >>at+set_config=lora:join_mode:0 | |
| ок | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at+set_config=lora;join_mode:0 发送 | |

设置 LoRa class 为 Class A:



设置频段为 EU868:



| | ^ |
|---------------------------------------|---|
| | |
| Selected LoRaWAN 1.0.2 Region: AU915 | |
| LoRa Initialization OK. | |
| >>at+set_config=lora:join_mode:0 | |
| ок | |
| >>at+set_config=lora:class:0 | |
| ок | |
| >>at+set_config=lora:region:EU868 | |
| Selected LoRaWAN 1.0.2 Region: EU868 | |
| Band switch success. | |
| ок | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at+set_config=lora:region:EU868 发送 | |

设置"dev_eui":

| | ^ |
|---|-----|
| Selected LoRaWAN 1.0.2 Region: AU915 | |
| LoRa Initialization OK. | |
| >>at+set_config=lora:join_mode:0 | |
| ок | |
| >>at+set_config=lora:class:0 | |
| ок | |
| >>at+set_config=lora:region:EU868 | - 1 |
| Selected LoRaWAN 1.0.2 Region: EU868 | |
| Band switch success. | |
| ок | |
| >>at+set_config=lora:dev_eui:5e9d1e0857cf25f1 | |
| ок | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at+set_config=lora:dev_eui:5e9d1e0857cf25f1 | 发送 |
| | |

设置"app_eui":



| | ^ |
|---|---|
| LoRa Initialization OK. | |
| >>at+set_config=lora:join_mode:0 | |
| OK | |
| >>at+set_config=lora:class:0 | |
| OK | |
| >>at+set_config=lora:region:EU868 | |
| Selected LoRaWAN 1.0.2 Region: EU868 | |
| Band switch success. | |
| OK | |
| >>at+set_config=lora:dev_eui:5e9d1e0857cf25f1 | |
| ок | |
| >>at+set_config=lora:app_eui:5e9d1e0857cf25f1 | |
| ОК | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at+set_config=lora:app_eui:5e9d1e0857cf25f1 | 送 |

设置"app_key":



开始 OTAA 入网:





| LoRa Initialization OK. | ^ |
|---|---|
| >>at+set_config=lora:dev_eui:68909f83d6d76b5f | |
| ок | |
| >>at+set_config=lora:app_eui:68909f83d6d76b5f | |
| ок | |
| >> | |
| at+set_config=lora:app_key:14179eea4f5250c1324389943020fc9d | |
| ок | |
| OTAA: | |
| DevEui:68909F83D6D76B5F | |
| AppEui:68909F83D6D76B5F | |
| AppKey:14179EEA4F5250C1324389943020FC9D | |
| OTAA Join Start | |
| ок | |
| [LoRa]:Joined Successed! | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at+join | |
| 发送 | |
| 200 | |

入网成功!

您可以在 loraserver 的页面上看到 joinRequest 和 joinAccept, 如下图所示。

| € | DoRaServer | | | | | Q Se | arch organization, application, gateway or device | ? 🕒 admin |
|----------|-------------------------------------|---|-----------------|---------------|-------------|------------------|---|------------|
| | Network-servers Gateway-profiles | A | oplications / R | AK811 / Devic | es / RAK811 | | | DELETE |
| | Organizations | | CONFIGURATION | KEYS (OTAA) | ACTIVATION | LIVE DEVICE DATA | LIVE LORAWAN FRAMES | |
| <u>*</u> | All users | | | | | | ⑦ HELP II PAUSE | AD 📋 CLEAR |
| loras | server 👻 | | DOWNLINK | 5:51:36 PM | JoinAccept | | | ~ |
| ۵ | Org. settings | | UPLINK | 5:51:36 PM | JoinRequest | 68909f83d6d76b5f | | ~ |
| | Ora users | _ | | | | | | |

发送数据到 LoRaServer , 如下图所示。

www.RAKwireless.com





| ок | ^ |
|---|---|
| >> | |
| at+set_config=lora:app_key:14179eea4f5250c1324389943020fc9d | |
| ок | |
| OTAA: | |
| DevEui:68909F83D6D76B5F | |
| AppEui:68909F83D6D76B5F | |
| AppKey:14179EEA4F5250C1324389943020FC9D | |
| OTAA Join Start | |
| ок | ÷ |
| [LoRa]:Joined Successed! | |
| >>at+set_config=lora:confirm:1 | |
| ок | |
| ок | |
| [LoRa]: Confirm data send OK | |
| | ~ |
| 发送窗口(默认发送回车) | |
| at+send=lora:2:1234567890 发送 | |

在 loraserver 页面上看到的模块发送的数据包如下图所示。

| € | DoRa Server | | | | Q Se | arch organization, application, gateway or device | ? 🕒 admin |
|------------|-------------------------------------|------------------|---------------|---------------------|------------------|---|---------------|
| | Network-servers Gateway-profiles | Applications / R | AK811 / Devic | es / RAK811 | | | DELETE |
| ₽ | Organizations | CONFIGURATION | KEYS (OTAA) | ACTIVATION | LIVE DEVICE DATA | LIVE LORAWAN FRAMES | |
| <u>*</u> | All users | | | | | ⑦ HELP Ⅱ PAUSE | CLEAR |
| Ioras | erver 👻 | DOWNLINK | 5:56:23 PM | UnconfirmedDataDown | 015bda95 | | ~ |
| \$ | Org. settings | UPLINK | 5:56:23 PM | ConfirmedDataUp | 015bda95 | | ~ |
| • | Org. users | DOWNLINK | 5:51:36 PM | JoinAccept | | | ~ |
| . ≡ | Service-profiles | UPLINK | 5:51:36 PM | JoinRequest | 68909f83d6d76b5f | | ~ |
| 규는 | Device-profiles | | | | | | |

4.2 ABP 模式入网

选择"DeviceProfile_ABP" 或者 "DeviceProfile_ABP_CN470"的入网模式,如下图所 示。

| € | DoRa Server | Q. Search organization, application, gateway or device | 0 | 9 (| eutest005 |
|----------|--------------------|--|------|------|-----------|
| test | • • | Analianting (DAV011 / Devices / Ocent | | | |
| <u>+</u> | Org. users | Applications / KAKOTT / Devices / Create | | | |
| .≞≡ | Service-profiles | Device name * | | | |
| | Device-profiles | RAK811_LORANode The name may only contain words numbers and dashes. | | | |
| R | Gateways | Device description * | | | |
| | Applications | RAK811 LoRa Node for testing | | | |
| 2 | Multicast-groups | Device EUI * 5e 9d 1e 08 57 cf 25 f1 | MS | в | C |
| | | Device-profile * DeviceProfile_ABP | | | * |
| | | Disable frame-counter validation Note that disabling the frame-counter validation will compromise security as it enables people to perform replay-attacks. | | | |
| | | | CREA | TE D | EVICE |



然后可以看到 "ACTIVATION"项中有一些 abp 参数:

| € | DoRa Server | Q. Search organization, application, gateway or device | ? | θ | eutest005 |
|-------------------------|--------------------|--|--------|--------|-----------|
| test0 | 05 👻 | Applications / DAK911 / Daviess / DAK911 | | - | DELETE |
| • | Org. users | Applications / RAROTT / Devices / RAROTT | | - | |
| £≡ | Service-profiles | DETAILS CONFIGURATION KEYS (OTAA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES | | | |
| 114 | Device-profiles | | | | |
| $\widehat{\mathcal{N}}$ | Gateways | Device address * 00 78 1f b9 | | MSB | C |
| | Applications | Network session key (LoRaWAN 1.0) * | | | |
| 2 | Multicast-groups | c2 80 cb 8d 1d f6 88 bc 18 60 1a 97 02 5c 54 88 | MSB | C | 8 |
| | | Application session key (LoTkaWAN 1.0)* 4d 42 ec 5c af 97 f0 3d 83 3c da f5 00 3f 69 e1 | MSB | C | Ø |
| | | Uplink frame-counter* | | | |
| | | Downlink frame-counter (network) * | | | |
| | | 0 | | | |
| | | | (RE)AC | TIVATE | DEVICE |

接下来需要使用以上的参数通过 AT 命令来配置 WisNode_LoRa。

设置 LoRa join mode 为 ABP:

| >at+set_config=lora:join_mode:1 | |
|---------------------------------|----|
| ж | |
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| | |
| 送窗口(默认发送回车) | |
| at+set_config=lora:join_mode:1 | |
| | 发送 |
| | |

设置 LoRa class 为 Class A:



| >>at+set_config=lora:join_mode:1 | |
|----------------------------------|----|
| ок | |
| >>at+set_config=lora:class:0 | |
| OK | |
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| ľ | |
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| | |
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| | |
| 发送窗口(默认发送回车) | |
| at+set_config=lora:class:0 | 发送 |
| | |

设置频段为 EU868:



设置 "dev_addr":

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| >>at+set_config=lora:join_mode:1 | |
|--|--|
| ок | |
| >>at+set_config=lora:class:0 | |
| OK | |
| >>at+set_config=lora:region:EU868 | |
| No switch region.Current region:EU868 | |
| ок | |
| >>at+set_config=lora:dev_addr:00781fb9 | |
| ок | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| 发送窗口(默认发送回车) | |

发送

设置 "nwks_key":



设置 "apps_key":

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| >>at+set_config=lora:join_mode:1 | |
|--|-----------|
| OK | |
| >>at+set_config=lora:class:0 | |
| ок | |
| >>at+set_config=lora:region:EU868 | |
| No switch region.Current region:EU868 | |
| ок | |
| >>at+set_config=lora:dev_addr:00781fb9 | |
| ок | |
| >> | |
| at+set_config=lora:apps_key:c280cb8d1df688bc18601a970 | 25c5488 |
| ок | |
| >>at+set_config=lora:nwks_key:4d42ec5caf97f03d833cdaf | 5003f69e1 |
| ок | |
| | |
| 发送窗口(默认发送回车) | |
| at +set_config=lora:nwks_key:4d42ec5caf97f03d833cdaf500 3f69e1 | 发送 |
| | |

使用 ABP 模式入网,如下图所示。



发送数据到 LoRaServer , 如下图所示。

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| OK | |
|------------------------------|----|
| [LoRa]: Confirm data send OK | |
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| | |
| 发送窗口(默认发送回车) | |
| at+send=lora:2:1234567890 | 发送 |
| | |
| | |

在 loraserver 页面上看到的模块发送的数据包如下图所示。

| € | LoRa Server | Q Search organization, application, gateway or device 2 0 | admin |
|-------|--------------------|---|-------|
| | Network-servers | Applications / RAK811 / Devices / RAK811_LoRaNode | LETE |
| R | Gateway-profiles | | |
| | Organizations | CONFIGURATION KEYS (OTAA) ACTIVATION LIVE DEVICE DATA LIVE LORAWAN FRAMES | |
| ÷ | All users | ⑦ HELP II PAUSE | LEAR |
| loras | erver 👻 | DOWNI INK 6-12-12 DM LinconfirmedDateDown 0178/cas0 | ~ |
| \$ | Org. settings | | - |
| • | Org. users | UPLINK 6:12:11 PM ConfirmedDataUp 0178cae9 | ~ |

到此 ABP 模式连接到 LoRaServer 就结束了。

5. 升级固件

如果您的 RAK811 或者 WisNode-LoRa 的固件版本高于 v3.0.0.0 (包括该版本),您 可以按照以下步骤升级固件:

1. 首先,让 RAK811 或者 WisNode-LoRa 在 boot 模式下工作。需要设置 at 命令 <at+set_config=device:boot>以使板子工作在 boot 模式下,如下图所示。



| RAK wireless | |
|----------------------|--|
| Technology Co., Ltd. | |

| 发送 |
|----|
| |

2. 下载固件升级工具(RAK Upgrade Tool), 下载链接如下:

https://www.rakwireless.com/en/download/LoRa/RAK612-LoRaButton#Tools

3. 如下图所示,打开该工具,配置串口,点击"Choose File"按钮选择你下载的固件的路径。

| 🔷 RAK LoRaButto | on Upgrade Too | V1.0 | - | × |
|----------------------------------|----------------|-----------------------|-------------|---|
| Config COM port: Baudrute: | COM5 115200 | ✓ | Choose File | |
| Name | Size | Location | | |
| | | | | |
| Please choose | e download fir | nware | | |
| | Start | | Stop | |

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注:请根据自己的板子对应下载高频或低频的固件(如 RAK811_HF_B_V3.0.0.0.bin 表示高频固件, RAK811_LF_B_V3.0.0.0.bin 表示低频固件)。

| 🗇 RAK LoRaButton Upgrade Tool V1.0 | | | 2 7 - 26 | | × |
|------------------------------------|----------------|---|---------------------|----------|----|
| Config COM port: Baudrute: | COM5 115200 | ✓ | Choose File |] | |
| Name RAK811_HF | Size 129KB | Location C:\Users\Fomi\Desktop\新811回 | 5件\RAK811_HF_E | 3_V3.0.0 | .0 |
| Please Start! | Start | | Stop | | |

4. 点击"Start",开始升级固件。

| 📀 RAK LoRaButton Upgrade Tool V1.0 | | | 10 | - | | × | |
|------------------------------------|--------|---------------|----------------|-------------|-------|--------|----|
| Config | | | | | | | |
| COM port: | COM5 | ~ | | | | | |
| Baudrute: | 115200 | ~ | Choose File | | | | |
| Name | Size | Location | | | | | |
| RAK811_HF | 129KB | C:\Users\Fomi | \Desktop\新811国 | 5件\RAK811_⊦ | HF_B_ | V3.0.0 | .0 |
| | | | | | | | |
| | | | | | | | |
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| Start sending. | | | | | | | |
| | | | | | - | | |
| | Start | | | Stop | | | |

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如下图所示,即表示固件升级成功。

| RAK LoRaButto | on Upgrade To | ol V1.0 | | | | × |
|---------------|---------------|-------------|----------------|------------------|--------|---|
| Config | | | | | | _ |
| COM port: | COM5 | ~ | | | | |
| Baudrute: | 115200 | ~ | | Choose File | | |
| | | | | | | |
| Name | Size | Location | | | | |
| RAK811_HF | 129KB | C:\Users\Fc | omi\Desktop\新8 | 11固件\RAK811_HF_B | V3.0.0 | 0 |
| | | | | | | |
| Upgrade succ | essi | _ | _ | | _ | |
| opgrade succ | 000: | | | _ | | |
| | Start | | | Stop | | |

然后关闭升级工具,打开串口工具,选择正确的 COM 端口,波特率为 115200,然后

打开串行端口并输入 at 命令<at+set_config=device:restart>重启设备,如下图所示,可

查看对应的固件版本号。



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6. 修订历史

| 版本 | 描述 | 日期 |
|-----|------|------------|
| 1.0 | 创建文档 | 2019-07-17 |

7. 文档概要

| 准备 | 审核 | 发布 |
|-----------|------|----|
| Fomi&Penn | Fomi | |



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RAK 是一家专注于 IoT 领域以产品为驱动型的公司,凭借团队深厚的无线通讯技术领域的积累,采 用创新的商业模式高效地为全球中小型的网络运营商(Network Operator),系统集成商(System Integrator)和服务提供商(Service Provider)等提供高性能的 IoT 产品与应用方案。

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