Browan Communications Inc.
No.15-1, Zhonghua Rd.,
Hsinchu Industrial Park,
Hukou, Hsinchu,
Taiwan, R.O.C. 30352
Tel: +886-3-6006899
Fax: +886-3-5972970

Document Number	BQW_01_0007.002

MiniHub Pro

WLRRTES – 102_TBMH110

Product Description

● Revision History

Revision	Date	Description
001	Feb. 22, 2021	Temporary release
002	Mar.08, 2021	Add FW features

BROWAN

● Copyright

© 2021 BROWAN COMMUNICATIONS INC.

This document is copyrighted with all rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language in any form by any means without the written permission of BROWAN COMMUNICATIONS INC.

● Notice

BROWAN COMMUNICATIONS INC. reserves the right to change specifications without prior notice.

While the information in this manual has been compiled with great care, it may not be deemed an assurance of product characteristics. BROWAN COMMUNICATIONS INC. shall be liable only to the degree specified in the terms of sale and delivery.

The reproduction and distribution of the documentation and software supplied with this product and the use of its contents are subject to written authorization from BROWAN COMMUNICATIONS INC.

● Trademark

The product described in this document is a licensed product of BROWAN COMMUNICATIONS INC.

● Contents

● Chapter 1 – Introduction

Purpose and Scope

The purpose of this document is to describe the main functions, supported features, and system architecture of the WLRRTES-102_TBMH110 MiniHub Pro based on the latest LoRaWAN® specification.

Product Design

The dimension of MiniHub Pro is with the dimension of 90 x 80 x 40 mm, and with one wall plug, and one USB Type-C connector.

Product Features

- EU, US band supported.

- Power input: Wall plug type with multiple plug options

- 802.11 b/g/n, Client Mode

- Compact design for mobile application

- Built-in LoRa & Wi-Fi antenna

- ESP32-D0WD by Espressif Systems

- Support Espressif FreeRTOS

- Support LoRa Packet Forwarder/LoRa Basic Station software switch

- Support Wi-Fi Configuration through local WEB GUI

- Support OTA from Browan OTA Server

- Support LoRaWAN® 1.0.3

- Support 8 LoRa uplink channels

- Another optional firmware supports certified AWS FreeRTOS. Please contact us for more details.
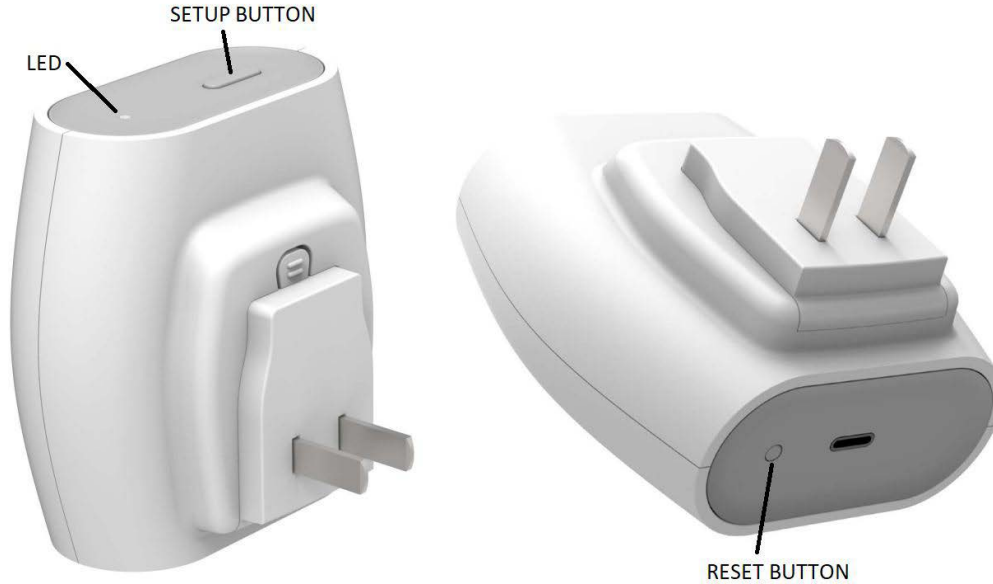
Definitions, Acronyms, and Abbreviations

Item	Description
LPWAN	Low-Power Wide-Area Network
LoRaWAN®™	LoRaWAN®™ is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery operated Things in a regional, national or global network.
ABP	Activation by Personalization
OTAA	Over-The-Air Activation
TBD	To Be Defined

Reference

Document	Author
LoRaWAN® Specification v1.0.3	LoRa Alliance
LoRaWAN® Regional Parameters v1.0.3	LoRa Alliance
LoRaWAN® Backend Interfaces Specification v1.0	LoRa Alliance

● Chapter 2 – Product Details

LED Indicators

Color	Status	Description
Green	Off	Power off.
	On	The MiniHub Pro is connected to LNS.
	Blinking	The MiniHub Pro is establishing the connection to LNS.
Orange	Off	N/A
	Blinking	Waiting for configuration. (Initial boot-up).
	Fast Blinking	The MiniHub Pro is trying to connect to a Wi-Fi network.

Buttons

Port	Count.	Description
Reset Button	1	Press and hold for 5 seconds to reset the MiniHub Pro to factory default settings.
Setup Button	1	Press and hold for 5 seconds to clear the Wi-Fi cache and switch back to AP mode.

I/O Ports

Port	Count	Description
USB-C Port	1	Reserved for future development

Package Label

No.	Item	Description
1	Product BOX	Brown Box
2	Labeling	Model/ MAC/ Serial Number/ Type Approval

Package Content

No.	Description	Quantity
1	The product	1
2	Power plug (in different SKU/Country)	1
3	Quick Guide	1

● Chapter 3 – System Specification

Hardware Specification

No.	Item	Description
1	Model Name	WLRRTES-102_TBMH110
2	Frequency Band	The following configuration is supported by different SKU: - EU 862~870 MHz - US 902~928 MHz
3	CPU	Espressif Systems ESP32-D0WD-V3 QFN-48
4	RAM/Flash	64Mbits / 32Mbits
5	RF Transceiver	SX1308 with SX1257 & SX1276 (channel scanning)
6	Number of Channels	8 concurrent channels
7	Wi-Fi	802.11 b/g/n 2.4GHz
8	Wi-Fi Transmit RF Power	+20 dBm
9	Wi-Fi Receive Sensitivity	11b, 1 Mbps - –98 dBm 11b, 11 Mbps - –91 dBm 11g, 6 Mbps - –93 dBm 11g, 54 Mbps - –75 dBm 11n, HT20, MCS0 - –93 dBm 11n, HT20, MCS7 - –73 dBm 11n, HT40, MCS0 - –90 dBm 11n, HT40, MCS7 - –70 dBm
10	Wi-Fi Security	WPA/WPA2
11	USB Port	One USB Type-C port for firmware upgrade
12	Working Temperature	Operating: 0℃ ~ 40℃ Storage: -10℃ ~ 60℃
13	Working Humidity	Operating: 10 ~ 85% (Non-Condensing) Storage: 5 ~ 90% (Non-Condensing)
14	Power Supply	100-240VAC 50/60Hz via power wall-type plug
15	Antenna Type	Built-in (1) Wi-Fi antenna and (1) LoRa antenna
16	Indicators	1 LED indicator
17	Dimensions	L:90 x W:80 x H:40 mm
18	Weight	200 g

LoRa Specification

No.	Item	Description
1	Standard	LoRaWAN® v1.0.3
2	LoRa Classes	- Class A: supported - Class B: to be supported in a later release - Class C: supported
3	ADR	The adaptive data rate is supported to control the spreading factor of nodes
4	Activation	Both Activation-by-Personalization (ABP) and Over-the-Air-Activation (OTAA) are supported
5	MAC Commands	LoRaWAN® v1.0.3

LoRa RF Specification

No.	Item	Capability	Remarks
1	Frequency Range	- EU 862~870 MHz - US 902~928 MHz	Separated SKU
2	Channel Band Width	125/250/500 kHz	8 uplinks + 1 downlink
3	Maximum Output Power	27 dBm	
4	Sensitivity	-142 dBm	BW=125KHz with SF=10
5	LoRa Modulation	Based on LoRaWAN®	

* All the radio performance is validated from 0 to 40 ℃

Software Specification

No.	Item	Description
1	Internet Connectivity	- thru Wi-Fi port with DHCP client
2	Wi-Fi Configuration	- SSID scan - Wi-Fi Connection configuration
3	Firmware Upgrade	- OTA check every 24 hours. - Enable/Disable
4	Firmware Version	- Current FW version
5	LoRa Agent	Support either of the below modes - LoRa Basic Station mode - LoRa Packet Forwarder mode
6	LoRa Packet Forwarder Mode	**LNS Configuration** - Server Address - Server uplink port - Server downlink port - Keep-alive interval - Statistics display interval - Push timeout **Frequency Configuration** - Uplink 8 channel frequency setting - LBT setting (Option)
7	LoRa Basic Station Mode	- Basic Station 2.0.5 - CUPS Enable - CUPS URI - import CUPS trust file - import CUPS CRT file - import CUPS key file - CUPS Disable - LNS URI - import LNS trust file - import LNS CRT file - import LNS key file

Regulatory Specification

No.	Item	Standard
1	FCC	ID: 2AAS9-TBMH110
2	CE	EN 62311:2008 EN 50665:2017 EN 50385:2017 EN 55032:2015/AC:2016, Class B EN 61000-3-2:2014, Class A EN 61000-3-3:2013 EN 55024:2010/A1:2015 EN 300 328 V2.2.2 (2019-07) EN 300 220-2 V3.1.1 (2017-02) EN 300 220-1 V3.1.1 (2017-02) EN 301 489-1 V2.2.3 (2019-11) EN 301 489-3 V2.1.1 (2019-03) EN 301 489-17 V3.2.2 (2019-12) IEC 62368-1:2014 (Second Edition) and/or EN 62368-1: 2014 + A11:2017
3	UL-CB	Ref. Certif. No.: DK-106850-UL

Reliability Specification

No.	Item	Specification
1	MTBF	100,000 @ 40 ℃