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

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MerryIoT Hub

WLRRTES – 106V2

Product Description

- Revision History

Revision	Date	Description	Author
.002	Sept. 28, 2023	Initial release	Jason
.003	Nov. 08, 2023	Naming	Vincent

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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-106V2 MerryIoT Hub based on the latest LoRaWAN® specification.

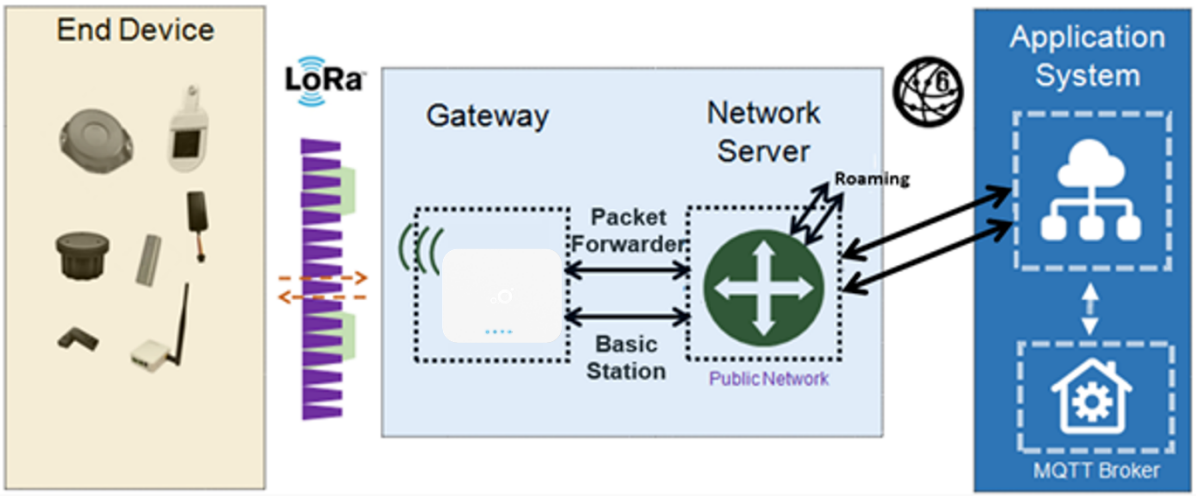
Product Design

The dimension of WLRRTES-106 MerryIoT Hub is with the dimension of 116 x 91 x 27 mm, and with one LAN port, one Micro-USB port for 5V DC power input, four LED indicators, and one reset button.

Product Features

- Up to 8 concurrent channels for LoRa® transmission
- Built-in 2.4G 802.11b/g/n Wireless LAN
- Various Access to the internet: Ethernet, Wi-Fi
- Support LoRaWAN® 1.0.3 packet forwarder and Basic Station mode (switched through local WEB GUI)
- Wi-Fi Configuration via local Web GUI
- Web GUI for LoRa® network server configuration
- Support Listen Before Talk in downlink
- Support Firmware upgrade through Browan OTA
- Internal antennas for LoRa® and Wi-Fi connection

System Architecture



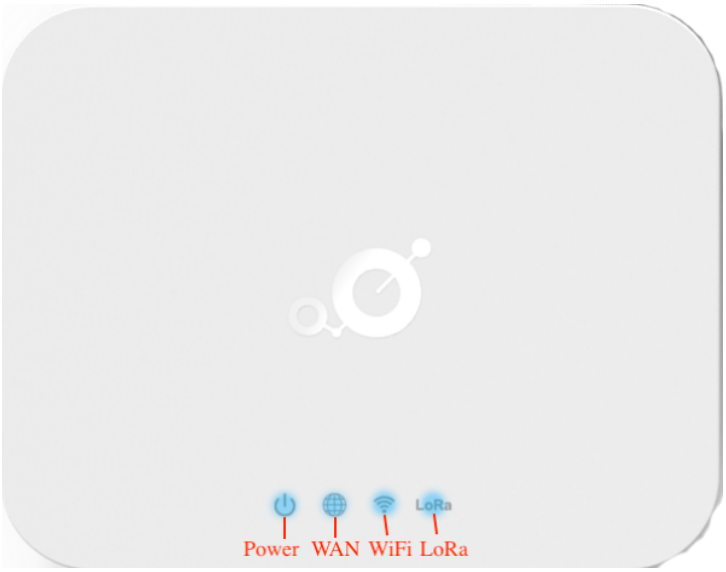
Definitions, Acronyms and Abbreviations

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®
RP002-1.0.1 LoRaWAN® Regional Parameters	LoRa Alliance®
LoRaWAN® Backend Interfaces Specification v1.0	LoRa Alliance®

Chapter 2 – Product Details



LED Indicators

- LED sequence: Power (System), WAN, Wi-Fi, LoRa®
- Solid LED is for static status, blanking means the system is upgrading or active devices linked to the corresponding port.

	Solid On	Blinking	Off
Power System (Blue)	Power ON	Booting (ignore bootloader)	Power Off
WAN (Blue)	Ethernet Plugged and got IP Address.	Connecting	Unplug
Wi-Fi (Blue)	Wi-Fi Station Mode and got IP Address.	Connecting	Wi-Fi Disabled
LoRa® (Blue)	LoRa® is working	Connecting	LoRa® is not working

Table 1 LED Behaviors

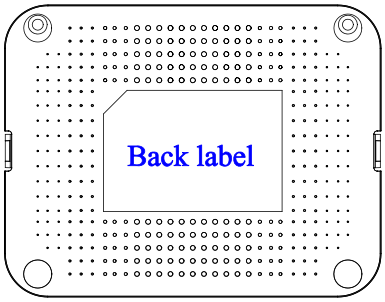
I/O Ports

Port	Q'ty	Description
RJ45	1	WAN port of the device
Reset	1	Reset to default (5 seconds to reset the settings to factory default)
Micro USB	1	Power input via USB adaptor(5VDC/2A)

Figure 1 – IO Ports

Back Label

The marking information is located at the bottom of the apparatus.



Back label

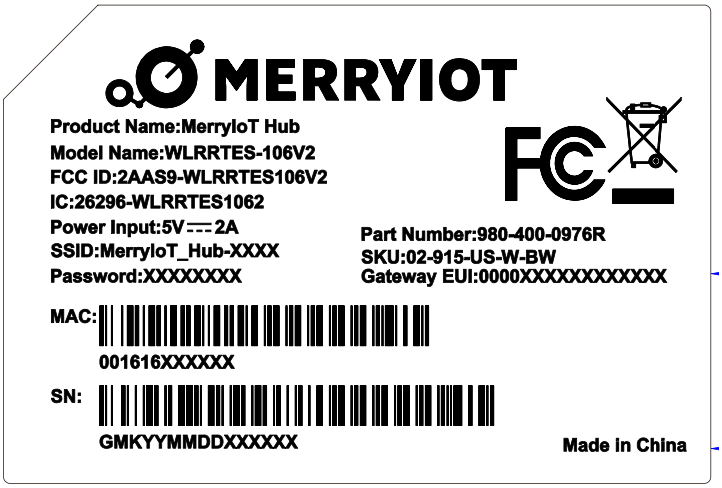


Figure 2 – Back Label

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 adapter (100-240VAC 50/60Hz to 5VDC/2A)	1
3	Ethernet Cable 1 meter (UTP)	1

Chapter 3 – System Specification

Hardware Specification

No.	Item	Description
1	Model Name	WLRRTES-106V2
2	Frequency Band	EU 862~870 MHz
3	Frequency Band (Optional)	The following configuration is supported by different SKU: - US 902~928 MHz - IN 865~867 MHz - AS 920~928 MHz - CN 470~510 MHz
4	CPU	Xtensa® single-/dual-core 32-bit LX6 microprocessor(s) up to 240MHz
5	RAM/Flash	64Mb/ 32Mb
6	RF Transceiver	Semtech SX1302
7	Number of Channels	8 concurrent channels
8	WiFi	802.11 b/g/n 1T1R, 2.4GHz
9	WAN Port	One RJ-45 10/100Base-T/TX, Autosensing, Auto-MDIX
10	Transmit RF Power	0.5W (up to 27 dBm)
11	Receive Sensitivity	Down to -140 dBm
12	Modulation	Based on LoRaWAN®
13	Security	AES 128
14	USB Port	One Mirco USB for power input
15	Working Temperature	Operating: 0℃ ~ 50℃ Storage: -10℃ ~ 60℃
16	Working Humidity	Operating: 10 ~ 85% (Non-Condensing) Storage: 5 ~ 90% (Non-Condensing)
17	Power Supply	5VDC/2A via Micro-USB port
18	Antenna Type	Built-in Wi-Fi antenna and LoRa® antenna
19	Indicators	4 LED indicators
20	Dimensions	L:116 x W:91 x H:27 mm
21	Weight	160 g

LoRa® Specification

No.	Item	Description
1	Standard	LoRaWAN® v1.0.3
2	LoRa® Classes	- Class A: supported - Class B: to be supported in later release - Class C: supported
3	ADR	Adaptive data rate is supported to control 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	
2	Frequency Range (Optional)	- US 902~928 MHz - IN 865~867 MHz - AS 920~928 MHz - CN 470~510 MHz	Optional for different SKUs
3	Channel Band Width	125/250/500KHz	-8 uplinks + 1 downlink -based on different domain of regulatory
4	Maximum Output Power	Up to 27 dBm	
5	Sensitivity	-142 dBm	BW=125KHz with SF=12

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

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Software Specification

3.1 Configuration/Performance/Capability

Features	Description
Network Configuration	WiFi or Ethernet switch Configuration
Performance	Gateway SHOULD support Class A/C end-device
Wi-Fi SSID	MerryIoT_Hub-XXXX where the last digits are the last 4 digits of the MAC address.
Wi-Fi Password	WiFi Password:(Printed in the back label) - 8 characters - Random English uppercase and lowercase, 2~9 numbers (default Skip: 0, O, 1, I, l, o)

3.2 Basic Features

Features	Description
OTA	Support OTA through Browan OTA Server (optional enable/disable)
Upgrade FW	Support upgrade FW feature through Local WEB
Wi-Fi Config	Support Wi-Fi configuration through local Web GUI - Scan SSID - Switch to Station mode and connect to the selected SSID
Reset Button	5 sec presses: Factory reset (wipe out Wi-Fi credentials, Ethernet and LNS credentials)
LED	Refer to Table 1-LED Behavior.
Ethernet Config	Support DHCP/Static IP Setting
Single WAN	Support Single WAN setting through Local WEB

3.3 LoRaWAN® features

Features	Description
Basic Station	Compatible with Standard LoRa® Basic Station - Semtech CUPS/LNS
Packet Forwarder	Compatible with Semtech LoRa® Packet Forwarder
Packet Forwarder Setting	Import json file for configuration
Basic Station Setting	● Option 1: CUPS access is DISABLED and only LNS configuration is allowed. Configuration and FOTA happen via AWS IoT and gateway has just the LNS configuration ● Option 2: CUPS access is ALLOWED and LNS configuration is known via CUPS. But it requires a public key and LNS configuration update in CUPS to point to the desired LNS. ○ LNS URI + Port Number ○ Public Key for the gateway which has been registered with CUPS ○ Customer will then need to add MAC, Private key and claim code onto their CUPS
Default Mode	Basic Station Mode

Regulatory Specification

No.	Item	Standard
1	FCC	2AAS9—WLRRTES106V2
2	Telec	TBD
3	CE	EN 300 328 V2.2.2(included EN 62311/EN 50665/EN 50385) EN 300 220-2 V3.1.1 EN 301 489-1 V2.2.3 EN 301 489-3 V2.1.1 EN 301 489-17 V3.2.4 EN 55032 / EN 55024 EN 62368-1 LVD
4	Anatel	TBD
5	IC	26296-WLRRTES1062

Reliability Specification

No.	Item	Specification
1	MTBF	300,000 @ 40 ℃