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Femto Lite Indoor Gateway

WLRRTES – 106

Product Description

- Revision History

Revision	Date	Description	Author
.001	Dec. 30, 2020	Initial release	Gary/Jason



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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-106 Femtohm Lite Indoor Gateway based on the latest Lora WAN[®] specification.

Product Design

The dimension of WLRRTES-106 Femto Lite Indoor Gateway 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.



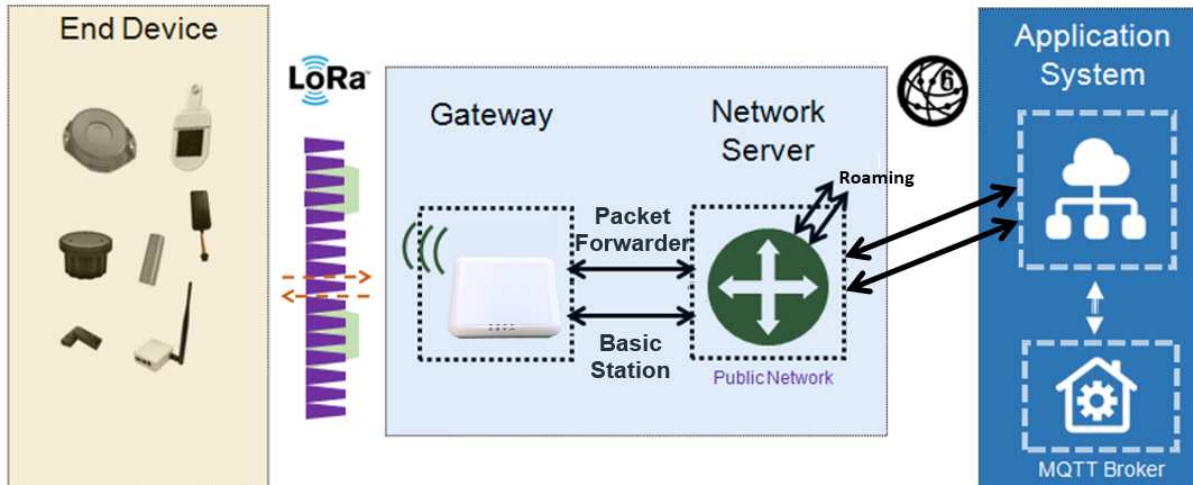


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Product Features

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

System Architecture





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Definitions, Acronyms and Abbreviations

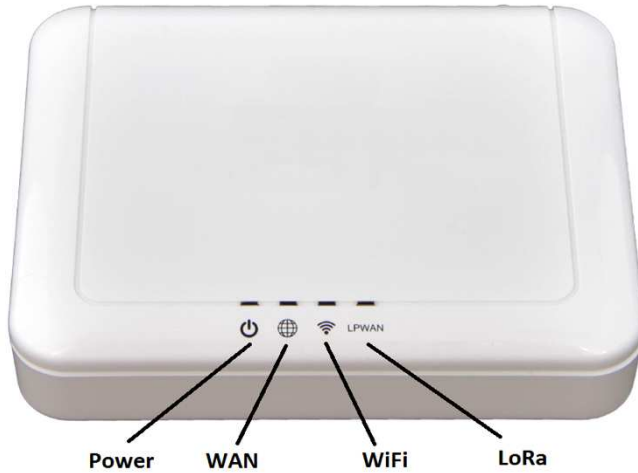
Item	Description
LPWAN	Low-Power Wide-Area Network
LoRaWAN [®]	LoRaWAN [®] is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery-operated Things in a regional, national or global network.
ABP	Activation by Personalization
OTAA	Over-The-Air Activation
TBD	To Be Defined

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, Wireless, LoRa
- One orange, three blue lights
- Solid LED indicates a static condition, the blinking LED indicates the system is in upgrading status, or activating the device to link to the corresponding ports

	Solid On	Blinking	Off
Power System (Orange)	Power ON	Booting (ignore bootloader)	Power Off
WAN (Blue)	Ethernet Plug and got IP Address.	Connecting	Unplug
Wireless (Blue)	WiFi Station Mode and got IP Address.	Connecting	Wireless Disable
LoRa (Blue)	LoRa is working	Connecting	LoRa is not working

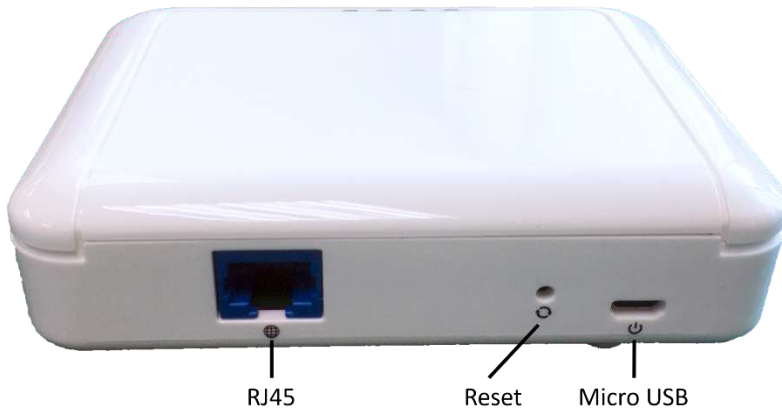
Table 1 LED Behaviors



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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)



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-106
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 SX1308/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°C ~ 50°C Storage: -10°C ~ 60°C
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	-140 dBm	BW=125KHz with SF=12

* All the radio performance is validated from 0 to 40 °C



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
WiFi	Femto_Lite-xxxxxx where the last digits are the last 6 digits of the MAC address.
WiFi Password	WiFi Password:(Printed in the back label) <ul style="list-style-type: none">- 12 characters- Random English uppercase and lowercase, 2~9 numbers (default Skip: 0, O, 1, l, 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
WiFi Config	Support WiFi configuration through local Web GUI <ul style="list-style-type: none">- Scan SSID- Switch to Station mode and connect to the selected SSID
Reset Button	5 sec press: Factory reset (wipe out WiFi 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	<ul style="list-style-type: none">• 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.<ul style="list-style-type: none">○ 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



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Regulatory Specification

No.	Item	Standard
1	FCC	TBD
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

Reliability Specification

No.	Item	Specification
1	MTBF	300,000 @ 40 °C

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