Outdoor Micro Gateway
WAPS-232N
Product Description

Revision History

Revision	Date	Description
001	Mar.19, 2020	Browan first released, with DOC ver. No. (BQW_01_0002.001)
002	Apr.22, 2020	Remove "SRRC" from "Regulatory Specification"
003	May.6, 2020	Modified contents of "SKU Detail" Modified contents of "3G/4G Band Support"
004	June.12, 2020	Modified contents of "3G/4G Band Support"
005	Aug.7, 2020	Corrected "Company Address" and "Copy Right"
006	Sep.4, 2020	Modified "Hardware Specification" Modified "Product Features"
007	Oct. 14, 2020	Added RCM details in "Regulatory Specification" Modified "Product SKU"
008	Jan.12, 2021	1. typo corrected.
009	Mar.11, 2021	Separated features of OPDK/Generic
010	Apr. 15, 2021	Added SKU-Indonesia
011	Jul. 9,2021	Modified Indonesia SKU to SEA area
012	June. 23, 2022	"SW Specification-Remote Management" removed
013	June. 29, 2022	(1) Updated image of System Architecture (2) LoRa Specification, updated "Class B" (3) Removed "WiFi" related items (4) Software Specification-System Status, added "WebGUI" (5) Software Specification-Firmware Upgrade, added "WebGUI"

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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 WAPS-232N Outdoor Micro Gateway based on the latest LoRaWAN specification.

Product Design

The dimension of the WAPS-232N Outdoor Micro Gateway is L:230 x W:200 x H:68 mm, with one (or two) external LoRa antenna port, one GPS antenna port and one WAN port with PoE capability. For 4G SKUs, one SIM slot and one 4G antenna port are available.

Product Features

- Compliance with LoRaWAN 1.0.3
- Up to 16 concurrent channels for LoRa transmission
- 3G/4G backhaul supported (in different SKUs)
- Optional support for wide frequency ranges from 470MHz to 928MHz (in different SKUs)
- More than 15km range LoS and 3km in a dense urban environment
- 1 Ethernet port (10/100Mbps) with PoE
- Downlink LBT
- GPS built-in
- Thousands to millions of devices depending on data model
- IP67 waterproof

Optional Features

- Works with Browan embedded network server (LoRaWAN Standalone Mode) by default, customer can specify the MQTT broker's address and it will direct data to your specified MQTT broker.
- Embedded network server.
- Two activation methods- ABP and OTAA

Product SKUs

SKU	Country	Channels	Frequency Band (MHz)	3G/4G Support	3G/4G Module
CN-08	China	8	CN470 (470~510)	N	N
CN-08-M	China	8	CN470 (470~510)	Y	EC20-CE
CN-16	China	16	CN470 (470~510)	N	N
CN-16-M	China	16	CN470 (470~510)	Y	EC20-CE
868M-08	Europe	8	EU868 (862~870)	N	N
868M-08-M-EU	Europe	8	EU868 (862~870)	Y	EC25-E
920M-16-J	Japan	16	AS923 (920~928)	N	N
920M-16-M-J	Japan	16	AS923 (920~928)	Y	EC25-J
920M-16-TW	Taiwan	16	AS923 (920~925)	N	N
920M-16-M-TW	Taiwan	16	AS923 (920~925)	Y	EC25-AU
900M-16	USA	16	US915 (902~928)	N	N
900M-16-M-A	USA	16	US915 (902~928)	Y	EC25-A
900M-08-A	USA	8	US915 (902~928)	N	N
900M-08-M-A	USA	8	US915 (902~928)	Y	EC25-A
900M-16-M-AU	AU	16	AU915(915~928)	Y	EC25-AU
900M-16-AU	AU	16	AU915(915~928)	N	N
900M-08-M-EU	SEA	8	AS923(920~928)	Y	EC25-E

3G/4G Band Support

3G/4G Module	EC25-E	EC25-J	EC25-A	EC25-AU	EC20-CE
Countries	Europe	Japan	USA	Australia/ Taiwan	China
LTE FDD	B1/B3/B5/B7/ B20	B1/B3/B5/B18/ B19/B26	B2/B4/B12	B1/B2/B3/B4 B5/B7/B28	B1/B3
LTE TDD	B38/B40/B41	B41	X	B40	B38/B39/B40/B41
WCDMA	B1/B5	B1/B6/B19	B2/B4/B5	B1/B2/B5	B1
TDSCDMA	X	X	X	X	B34/B39
CDMA 1x/EVDO	X	X	X	X	BC0

System Architecture

The WAPS-232N Outdoor Micro Gateway can be provisioned to support different LoRa system as follows:

Packet Forwarder mode and Basic Station mode, that can work with a specific network server.
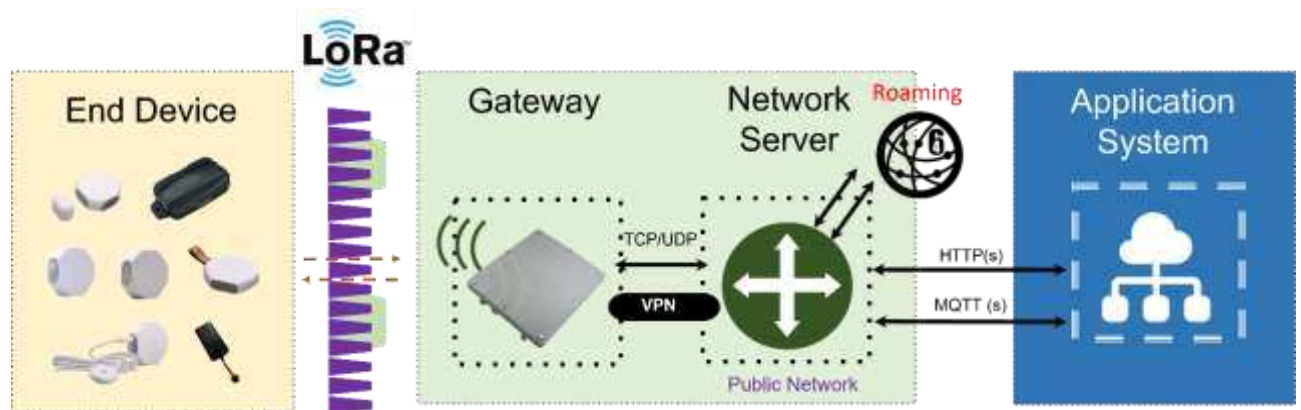
Definitions, Acronyms and Abbreviations

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

I/O Ports
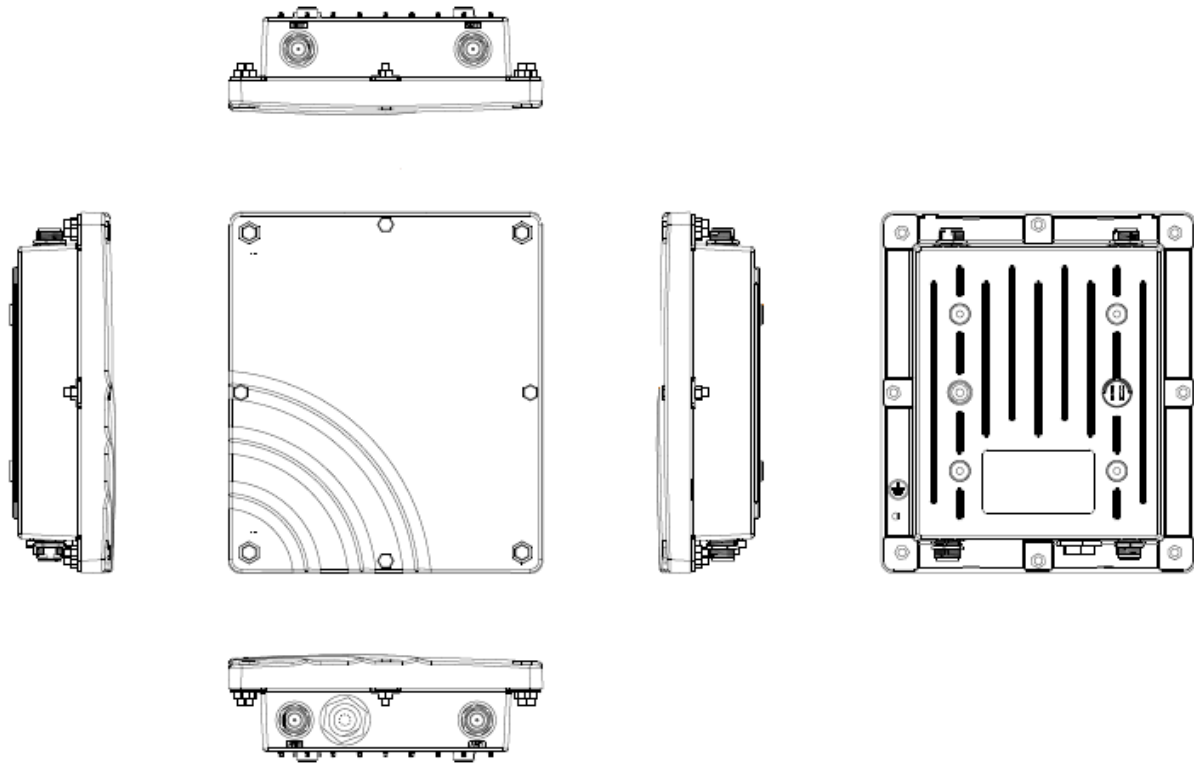
Port	Count	Description
ANT1	1	External N-Type GPS antenna
ANT2	1	External N-Type 3/4G antenna (Optional)
ANT3	1	External N-Type LoRa antenna for CH 1-8
ANT4	1	External N-Type LoRa antenna for CH 9-16
RJ45	1	10/100Mbps Ethernet port with power over Ethernet (PoE) function
SIM Slot	1	Mini SIM card slot for 3/4G module

Package Content

No.	Description	Quantity
1	The product	1
2	GPS antenna & RF cable	1
3	Mounting kit	1
4	RJ45 waterproof kit	1
5	3G/4G antenna	1
6	PoE power adapter & cord	1

Chapter 3 – System Specification

Hardware Specification

No.	Item	Description
1	Model Name	WAPS-232N_LW
2	Frequency Band	EU 862~870 MHz / US 902~928 MHz / IN 865~867 MHz / AS 923 MHz / CN 470~510 MHz / AU915~928 MHz
3	CPU	Quad-core Cortex-A9 up to 1.6GHz
4	RAM/Flash	DDRIII 8Gbit / NAND 64Gbit
5	RF Transceiver	SX1301 with SX1257 or SX1255 for CN470 SKU
6	Number of Channels	8 or 16 Channels (In different SKU)
7	WAN Port	-10/100Mbps fast Ethernet with PoE - Withstands common mode surge test ±6KV (10/700us) at Ethernet RJ45 Port
8	Transmit RF Power	0.5W (up to 27 dBm)
9	Receive Sensitivity	Down to -142 dBm
10	Modulation	LoRa AES 128 bit
11	Security	AES 128 bit
12	USB Port	N/A
13	Operating Temperature	-20ºC ~ 60ºC (optional for -40ºC~ 60ºC)
14	Storage Temperature	-40ºC ~ 60ºC
15	Power Supply	55V / 0.6A via PoE Adaptor (Microsemi PD-9001GR 802.3at)
16	Antenna Type	External N-Type antennas
17	Ingress Protection	IP67
18	Interfaces	1 LAN port, 2 LoRa antenna connectors, 1 GPS antenna connector, One 3G/4G antenna (option), 1 SIM slot (option)
19	Indicators	N/A
20	Dimensions	L:230 x W:200 x H:68 mm
21	Weight	2.05 Kg

LoRa Specification

No.	Item	Description
1	Standard	LoRaWAN v1.0.3
2	LoRa Classes	- Class A: supported - Class B: to be supported by request - 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
		Min	Type	Max	Units	
1	Frequency Range	- EU 862~870 MHz - US 902~928 MHz - IN 865~867 MHz - AS 920~928 MHz - CN 470~510 MHz - AU 915~928 MHz			MHz	In separated SKU
2	Channel Band Width	125/500			KHz	8 (or 16) uplink + 2 (or 1) downlink
3	Output power (TX)			27	dBm	Downlink
4	Sensitivity (RX)			-142	dBm	BW=125KHz with SF=10

Software Specification

No.	Item	Description
1	Internet Connectivity	- thru WAN port with fixed IP/ DHCP client - thru 3G/LTE module
2	Network Configuration	- DHCP server for IP leasing - Diagnostics with Ping, TraceRoute and NSlookup
3	System Status	WebGUI
4	LoRa Information	- Current LoRa channel configuration and Gateway ID - Supported spreading factors - Provision code - External network server configuration and logs by provision code. - Channel scan by provision code.
5	Channel Scan	The gateway can scan all supported channels based on ISM band regulation. SX1301 with SX1257: - EU 863-870 MHz - US 902-928 MHz - AU 915-928 MHz SX1301 with SX1255: - CN 470-510 MHz
6	Time Sync	Support Network Time Protocol (NTP)
7	Firmware Upgrade	- Over-the-air (OTA) upgrade - Local upgrade via WebGUI
8	LoRa Uplink Message Format (LoRaWAN mode with external MQTT broker)	Uplink Message (to network server) includes: 1. Channel info 2. Spreading factor 3. Received time 4. Gateway IP 5. Gateway ID 6. Received RSSI 7. Received SNR 8. Device address of end-node 9. Uplink data 10. Frame count 11. F-port 12. Option length

| 9 | LoRa Downlink Message Format (LoRaWAN mode with external MQTT broker) | Downlink Message (from network server) includes:
1. Device address of end-node
2. Downlink data
3. Gateway ID
4. Any string ID (for tracking purpose)
5. Un-confirmed or confirmed data
6. Receive window (RX1 or RX2) |

Software Specification (Optional)

No.	Item	Description
1	LoRaWAN Configuration (LoRaWAN mode with embedded network server)	- Current OTAA end-node list - Detailed end-node logs at Gateway - ABP table for managing end-node device with ABP mode (user-defined DevAddr/ NwkSKey/ AppSKey) - OTAA table for managing end-node with OTAA mode (user-defined AppEUI/ DevEUI/ AppKey/ DevAddr Start Counts/ Aging Out time)
2	Provisioning	Auto/manual provisioning with area code/customer code for configuring regional frequency bands and switch over between LoRaWAN Standalone mode or packet forward mode

*Note: Please feel free to contact us for more details about these optional features at www.browan.com or email us directly: sales@browan.com.

Regulatory Specification

No.	Item	Standard
1	FCC	ID: MXF-WAPS232N
2	Telec	Low Power No: 201-163369 / 00
		High Power No: 201-170679 / 00
3	CE	EN 303 413 V1.1.1
		EN 301 489-1-3-19-52
		EN 300 220 V3.1.1
		EN 301 908-1 V11.1.1
		EN 55032 + EN 55024
		EN 50385 + EN 62311
4	NCC	ID: CCAF18LP2180T2
5	RCM	AS/NZS 4268: 2017
		AS/NZS CISPR 32: 2015 (CLASS B)
		AS60529-2004
		AS/NZS 60950.1:2015
		IEC60529:2013
		Electromagnetic Exposure (EME)