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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	1. Modified contents of “SKU Detail” 2. 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	1. Modified "Hardware Specification" 2. Modified "Product Features”

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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
- Cloud service to support easy deployment
- Thousands to millions of devices depending on data model
- IP67 waterproof

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)	N	EC20-CE
CN-16	China	16	CN470 (470~510)	N	N
CN-16-M	China	16	CN470 (470~510)	N	EC20-CE
868M-08	Europe	8	EU868 (862~870)	N	N
868M-08-M-EU	Europe	8	EU868 (862~870)	N	EC25-E
920M-16-J	Japan	16	AS923 (920~928)	N	N
920M-16-M-J	Japan	16	AS923 (920~928)	N	EC25-J
920M-16-TW	Taiwan	16	AS923 (920~925)	N	N
920M-16-M-TW	Taiwan	16	AS923 (920~925)	N	EC25-AU
900M-16	USA	16	US915 (902~928)	N	N
900M-16-M-A	USA	16	US915 (902~928)	N	EC25-A
900M-08-A	USA	8	US915 (902~928)	N	N
900M-08-M-A	USA	8	US915 (902~928)	N	EC25-A

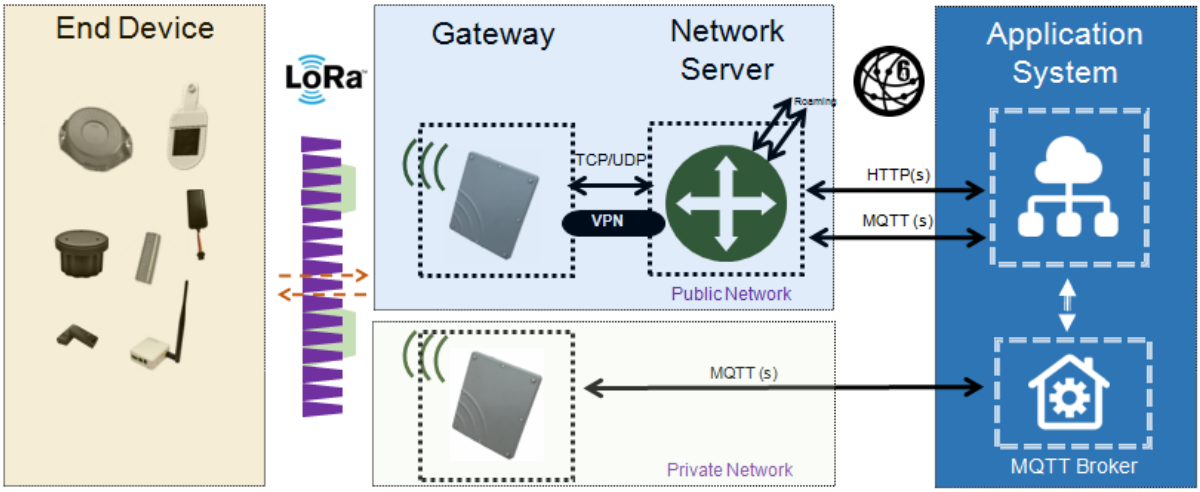
3G/4G Band Support

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 systems, as follows:

1. LoRaWAN mode - Network server embedded to support private network.
2. Packet Forwarder mode – Built with customized software that can work with specific network server.



Definitions, Acronyms and Abbreviations

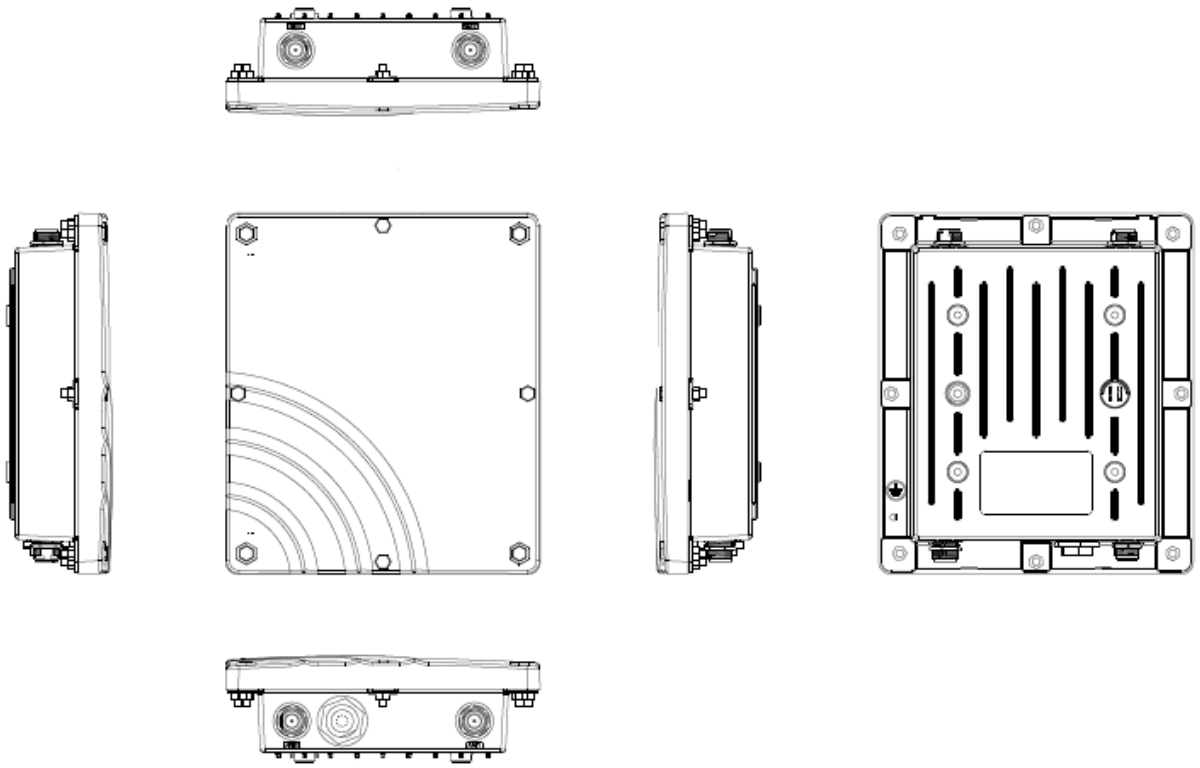
LPWAN	Low-Power Wide-Area Network
LoRaWAN™	LoRaWAN™ is a Low Power Wide Area Network (LPWAN) specification intended for wireless battery-operated Things in a regional, national or global network.
ABP	Activation by Personalization
OTAA	Over-The-Air Activation
TBD	To Be Defined

Reference

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	WiFi	N/A
8	WAN Port	-10/100Mbps fast Ethernet with PoE - Withstands common mode surge test ±6KV (10/700us) at Ethernet RJ45 Port
9	Transmit RF Power	0.5W (up to 27 dBm)
10	Receive Sensitivity	Down to -142 dBm
11	Modulation	LoRa AES 128 bit
12	Security	AES 128 bit
13	USB Port	N/A
14	Operating Temperature	-20ºC ~ 60ºC (optional for -40ºC~ 60ºC)
15	Storage Temperature	-40ºC ~ 60ºC
16	Power Supply	55V / 0.6A via PoE Adaptor (Microsemi PD-9001GR 802.11at)
17	Antenna Type	External N-Type antennas
18	Ingress Protection	IP67
19	Interfaces	1 LAN port, 2 LoRa antenna connectors, 1 GPS antenna connector, One 3G/4G antenna (option), 1 SIM slot (option)
20	Indicators	N/A
21	Dimensions	L:230 x W:200 x H:68 mm
22	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 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
		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			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	WiFi Configuration	N/A
3	Network Configuration	- DHCP server for IP leasing - Diagnostics with Ping, TraceRoute and NSlookup
4	System Status	N/A
5	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.
6	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/ NwkSKey/ AppSKey) - OTAA table for managing end-node with OTAA mode (user-defined AppEUI/ DevEUI/ AppKey/ DevAddr Start Counts/ Aging Out time)
7	Provisioning	- Current LoRa channel configuration and Gateway ID - Supported spreading factors - Provision code - External network server configuration and logs - Channel scan
8	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

No.	Item	Description
9	Time Sync	Support Network Time Protocol (NTP)
10	Firmware Upgrade	- Over-the-air (OTA) upgrade
11	Remote Management	- Manual provisioning with public and private data model - Keepalive with CPU load, memory usage and in/out traffic
12	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
13	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)

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