

ED-GWL2110

An outdoor gateway based on Raspberry Pi CM4

EDA Technology Co.,Ltd
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1 Product Overview

ED-GWL2110 is an outdoor gateway based on Raspberry Pi CM4. The whole machine is sealed with all-aluminum alloy outer box, which has good waterproof, moisture-proof, insect-proof and lightning-proof performance. It supports LoRa modules with different frequency bands (external antennas with different frequency bands are required); It supports optional 4G module to ensure that outdoor equipment can upload and download data normally. The device has on-board GNSS module, which can easily meet the positioning requirements. The watchdog module is provided, which can effectively prevent the device from being stuck and greatly increase the stability of the equipment operation. Moreover, this device is equipped with a special encryption chip, which is mounted on the I2C bus to ensure the information security of the device. The device is also equipped with RTC module to ensure the reliability.

1.1 Target Application

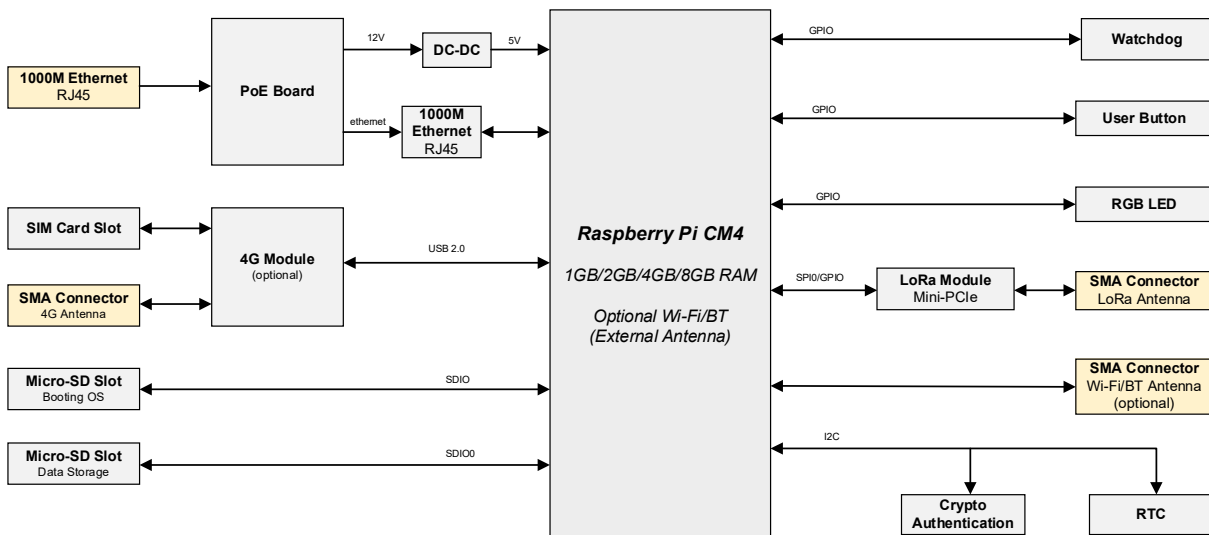
- LoRa intelligent gateway
- Smart manufacturing
- Smart city
- Smart transportation

1.2 Specifications

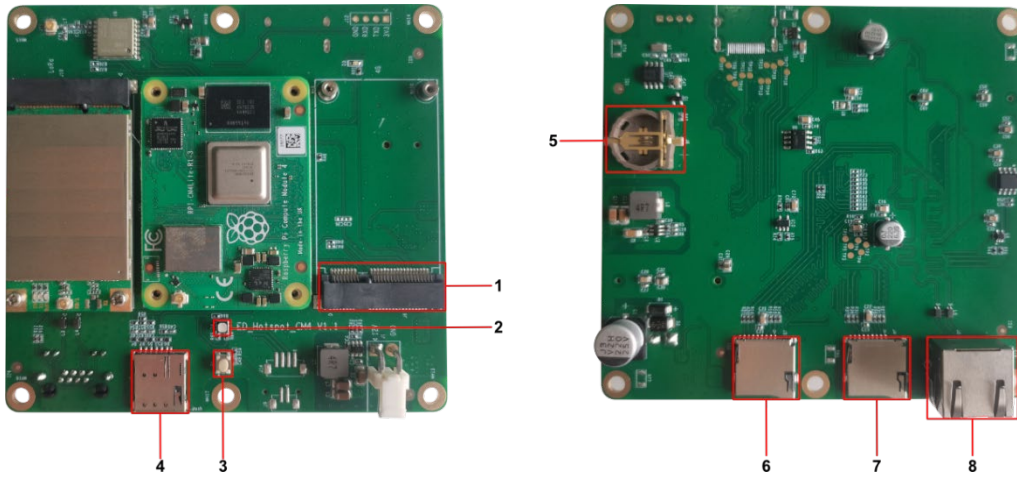
Function	Description
CPU	Broadcom BCM2711, quad core Arm Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
Memory	Options for 1GB, 2GB, 4GB, 8GB LPDDR4-3200 SDRAM
SD Card	Options for 32GB and 64GB SD card. It supports booting the OS from SD card.
Ethernet	1x Gigabit Ethernet
Wi-Fi/BT (optional)	<ul style="list-style-type: none"> ● 2.4GHz&5GHz dual Wi-Fi, compatible with IEEE 802.11 b/g/n/ac ● Bluetooth 5.0, support BLE
4G (optional)	Support various 4G LTE modules
LoRa	Compatible with LoRaWAN protocol, support 3 frequency bands <ul style="list-style-type: none"> ● 868MHz (EU868) ● 915MHz (US915) ● 470MHz (CN470)
GNSS	Built-in GNSS, support multi-satellite system <ul style="list-style-type: none"> ● GPS L1 C/A: 1575.42 ±1.023 MHz ● BeiDou B1I: 1561.098 ±2.046 MHz ● GLONASS L1: 1597.78~1605.66 MHz
Internal IO	1x Serial (TTL), available for the system default console <ul style="list-style-type: none"> ● 1x User-defined button

Function	Description
	<ul style="list-style-type: none"> ● 1x RGB 3-color LED ● 1x RTC battery base, using for installing CR1220 battery ● 1x Nano SIM card slot ● 2x Micro-SD card slot
Expansion Performance	<ul style="list-style-type: none"> ● Support watchdog function to prevent the system from being stuck ● On-board encryption chip
Power Input	PoE power supply, support 802.3af standard
Dimensions	194.2mm(W) x 194.2mm(D) x 65 mm (H)
Case	Cast aluminum waterproof shell, IP65 waterproof grade
Working Temperature	-25°C ~ 60°C

1.3 System Diagram



1.4 Internal IO

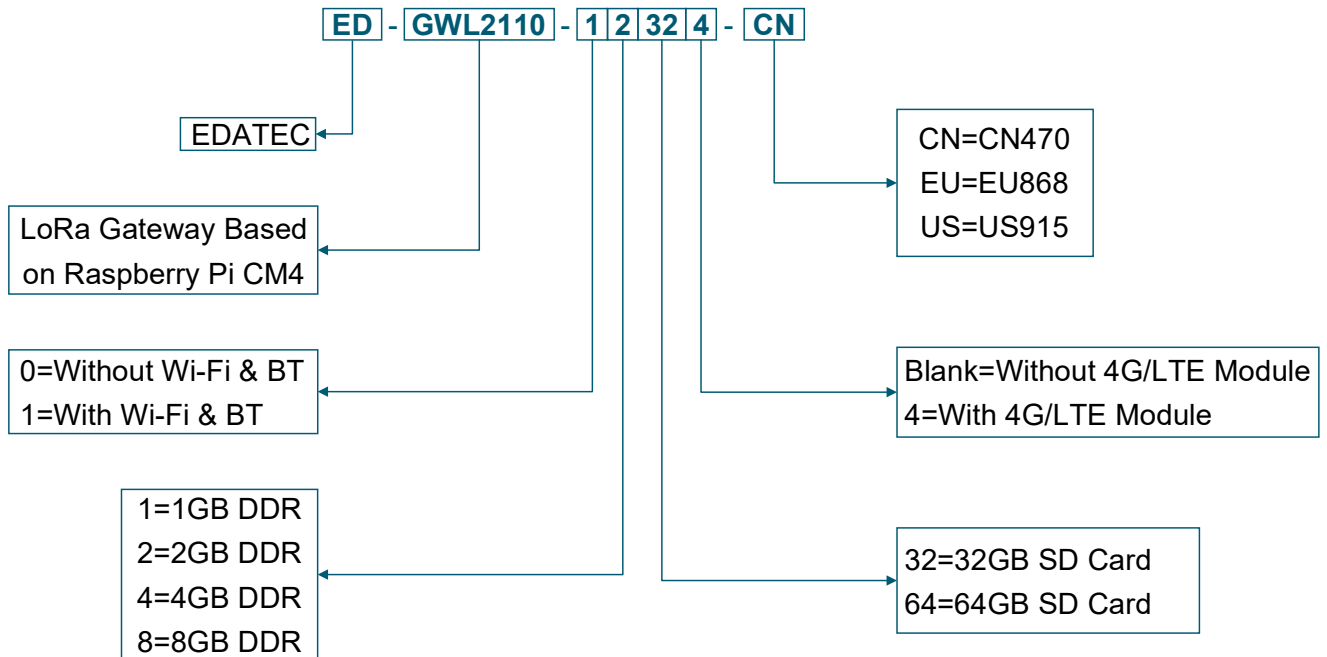


NO.	Function Description
1	4G mini-PCle Connector
2	RGB LED
3	User Button
4	Nano SIM Card Slot
5	RTC Battery Base
6	Micro-SD Card Slot (User Data Storage)
7	Micro-SD Card Slot (booting OS)
8	Gigabit Ethernet

1.5 Packing List

- 1x ED-GWL2110 Unit
- 1x LoRa Antenna
- [optional Wi-Fi/BT Version]1x 2.4GHz/5GHz Wi-Fi/BT Antenna
- [optional 4G Version]1x 4G/LTE Antenna

1.6 Order Code



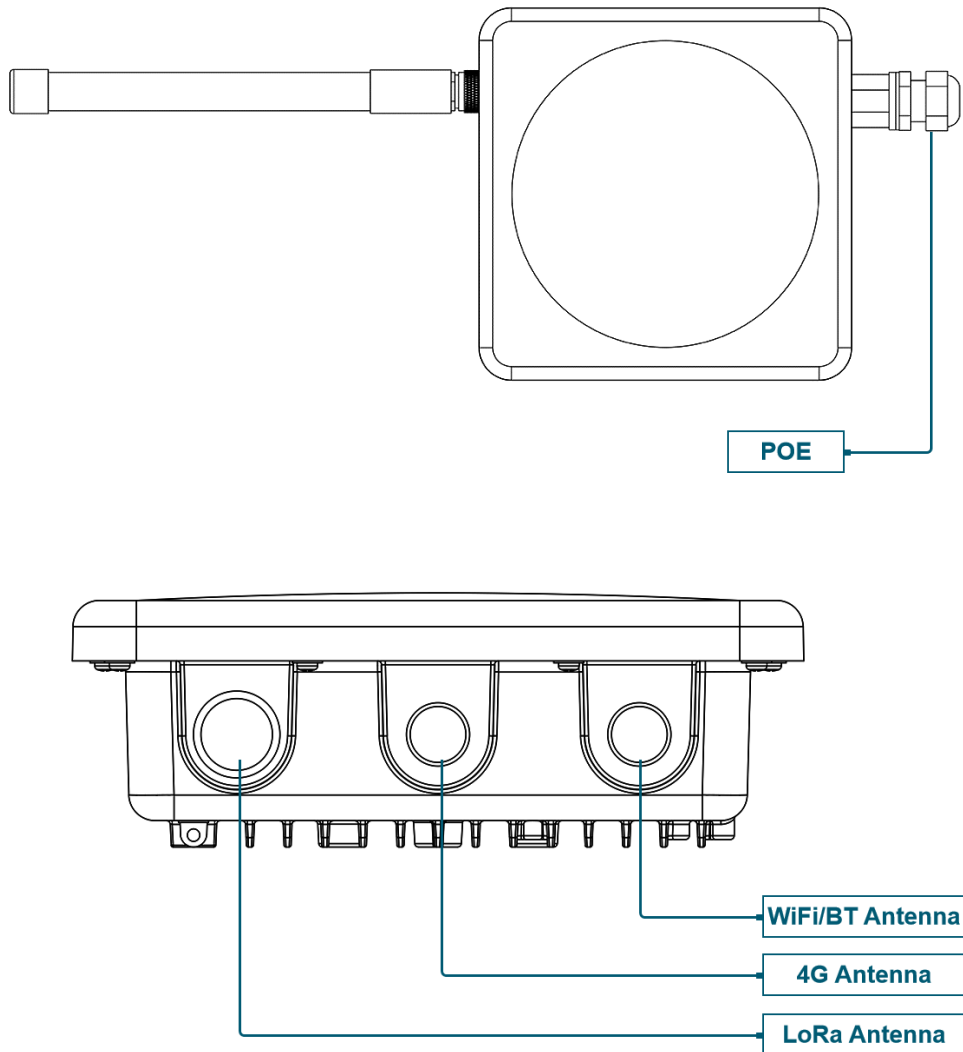
Example

P/N: **ED-GWL2110-12324-CN**

Configuration: An outdoor light gateway based on Raspberry Pi CM4, with Wi-Fi & Bluetooth, 2GB DDR, 32GB SD card, 4G and CN470 LoRa frequency.

2 Product Appearance and Structure

2.1 Product Appearance



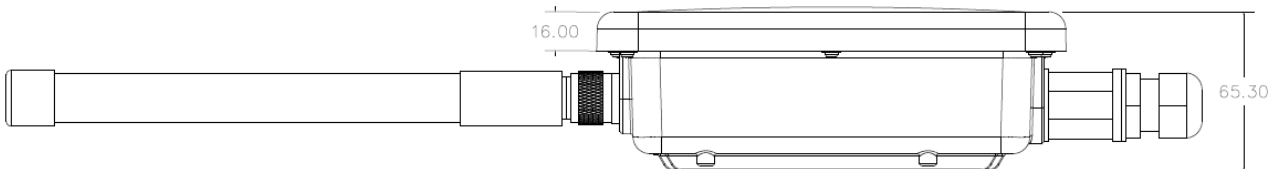
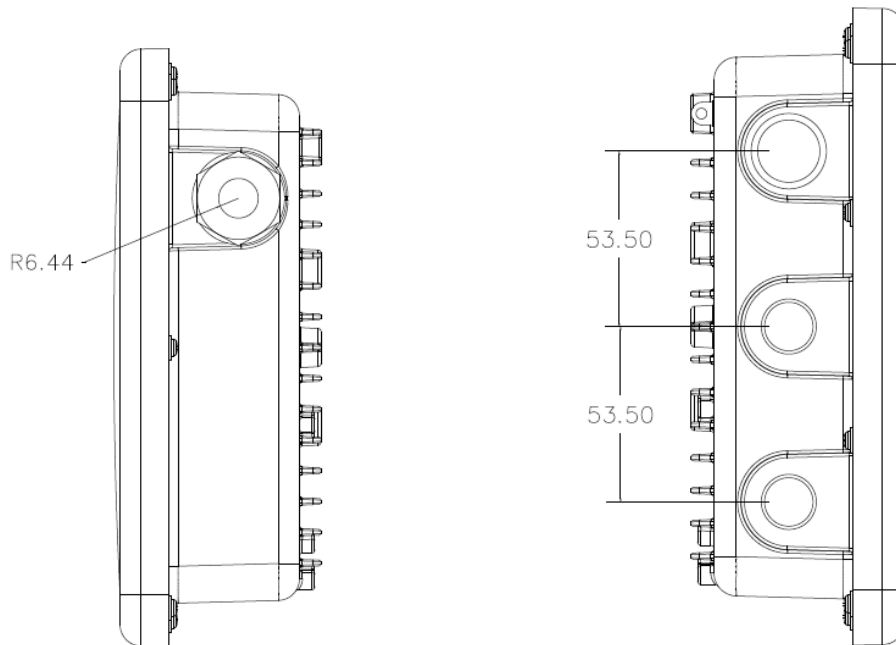
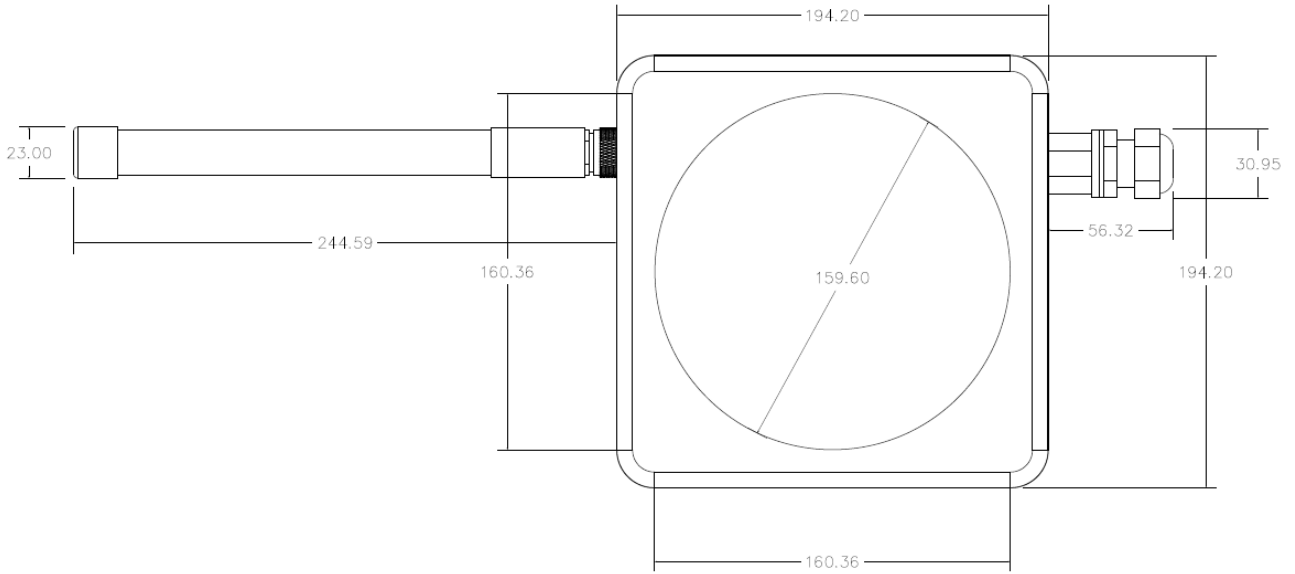
TIP:
The number of antenna ports depends on the product model selected by the user. Please refer to the actual product model for details.

2.2 Product Photo



2.3 Dimensions

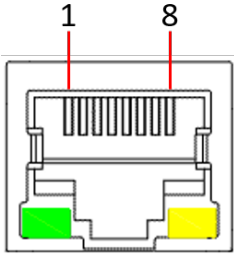
unit: mm, tolerance: $\pm 0.1\text{mm}$



3 Interfaces and Connectors

3.1 PoE Ethernet Port

ED-GWL2110 includes a Gigabit Ethernet port with PoE function. The device is powered and communicates over the network through the PoE Ethernet port.

	Pin ID	Pin Name
	1	TRD0+
	2	TRD0-
	3	TRD1+
	4	TRD2+
	5	TRD2-
	6	TRD1-
	7	TRD3+
8	TRD3-	

3.2 Antenna Port

ED-GWL2110 contains multiple SMA ports, including Wi-Fi/BT antenna port, 4G antenna port and LoRa antenna port, which are used for connecting antennas.

4 Internal IO

4.1 RTC

ED-GWL2110 has an internal RTC. A CR1220 button battery (RTC backup power supply) is installed by default in China, which can ensure that the system has a reliable clock and is not affected by factors such as device power failure. The RTC clock chip is mounted on the i2c-1 bus, and the device address is 0x51.

4.2 User Button

ED-GWL2110 includes a user button, and the user can customize the button function. The button is connected with GPIO7, which is high by default. When the button is pressed, it will drive GPIO7 to low level.

#	Signal	Pin
1	Button	GPIO7

4.3 LED

ED-GWL2110 contains a three-color LED indicator, which is controlled by three GPIOs. It can display a variety of different colors according to different configuration states. The control pins are GPIO11 for blue, GPIO12 for green, and GPIO13 for red. GPIO low level is valid.

#	Signal	Pin
1	LED_Blue	GPIO11
2	LED_Green	GPIO12
3	LED_Red	GPIO13

4.4 Micro-SD Card

ED-GWL2110 contains two Micro-SD card slots, and on-board J4 and J3 interfaces correspond to the system card slot and data storage expansion card slot respectively.

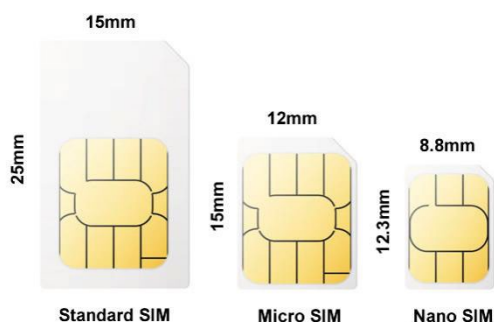
Interface J4 is used for main file system storage, and the inserted SD card is used for booting OS.

Interface J3 is only used for data storage expansion, and the inserted SD card is used to store user data.

4.5 SIM Card

ED-GWL2110 supports optional 4G LTE. You need to install a Nano SIM card before using the 4G function.

The size differences between standard SIM and Micro SIM and Nano SIM cards are as follows:



4.6 LoRa Module Reset

The reset function of LoRa module is controlled by GPIO8.

LoRa module reset pin definition:

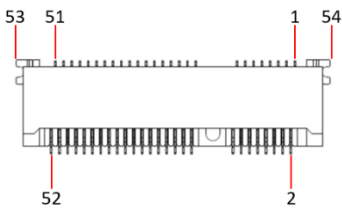
#	Signal	Pin
1	LoRa_Reset	GPIO8

4.7 4G mini-PCle Port

ED-GWL2110 includes a 4G Mini PCIe interface for expanding 4G modules.

The 4G mini-PCle pin is defined as follows:

Pin ID	Pin Name	Pin ID	Pin Name	Pin ID	Pin Name
1	NC	21	GND	41	3V3
2	3V3	22	4G_Reset	42	LED_WWAN
3	NC	23	NC	43	GND
4	GND	24	3V3	44	NC
5	NC	25	NC	45	NC
6	NC	26	GND	46	NC
7	NC	27	GND	47	NC
8	USIM_VDD	28	NC	48	NC
9	GND	29	GND	49	NC
10	USIM_DATA	30	NC	50	GND
11	NC	31	NC	51	NC
12	USIM_CLK	32	NC	52	3V3
13	NC	33	NC	53	GND
14	USIM_RST	34	GND	54	GND
15	GND	35	GND		
16	NC	36	USB_DM		
17	NC	37	GND		
18	GND	38	USB_DP		
19	NC	39	3V3		
20	3V3	40	GND		



4G module reset pin definition:

#	Signal	Pin
1	4G_Reset	GPIO10

4.8 GNSS

ED-GWL2110 integrates L76K GNSS module and supports multi-satellite systems.

- GPS L1 C/A: 1575.42 ±1.023 MHz
- BeiDou B1I: 1561.098 ±2.046 MHz
- GLONASS L1: 1597.78~1605.66 MHz

The communication interface of GNSS module is UART serial port, and the default baud rate is 9600bps, which is connected with UART2 of Raspberry Pi CM4. 1PPS function is supported, and 1PPS output signal is connected with PPS pin of LoRa module.

The WakeUp signal of L76K GPS module is connected to GPIO4. If the pin module is pulled down, it will enter standby mode, and if it is pulled up or suspended, it will return to continuous mode. The Reset signal is connected to GPIO5. Pulling this pin low for 100ms will reset the module. SET signal is connected with GPIO6, which is used to configure the satellite combination. When the pin is suspended or high level, the satellite combination is GPS and Beidou, and when the pin is low level, the satellite combination is GPS and GLONASS.

#	Signal	Pin
1	GPS_WakeUp	GPIO4
2	GPS_Reset	GPIO5
3	GPS_Set	GPIO6

4.9 Watchdog

ED-GWL2110 has a watchdog timer, which is used to automatically correct temporary hardware failures and prevent errors or malware from interfering with system operation.

Watchdog pin definition:

#	Signal	Pin	Description
1	WD_OE	GPIO17	Output is high to enable watchdog, output is low to disable watchdog, and default is disabled.
2	WD_A	GPIO16	Watchdog Feed dog input signal

4.10 Encryption chip

ED-GWL2110 is equipped with ATECC608 encryption chip, which is connected to i2c-1 bus, and the default address of the device is 0x60.

5 Wireless Communication

5.1 Wi-Fi

ED-GWL2110 support 2.4GHz &5GHz dual Wi-Fi.

2.4G frequency band

Parameter	Description
Frequency range	802.11b/g/n(HT20): 2412-2472MHz 802.11n(HT40): 2422-2462MHz
Modulation system	802.11b: DSSS 802.11g/n: OFDM
Frequency Step	5M

5G frequency band

Parameter	Description
Frequency range	802.11a/n/ac: 5150-5350MHz 5470-5725MHz 5725-5850MHz
Modulation system	BPSK
Frequency Step	5M

5.2 Bluetooth

ED-GWL2110 support bluetooth5.0.

Parameter	Description
Frequency range	2402-2480MHz
Modulation system	GFSK, DPSK
Frequency Step	2M

5.3 4G LTE

The ED-GWL2110 has a mini PCIe slot for 4G LTE module connection.

#	4G Module	Support Country	Support Band
1	EC20-CE	China / India	LTE FDD: B1/B3 LTE TDD: B38/B39/B40/B41 TDSCDMA: B34/B39 WCDMA: B1 CDMA 1x/EVDO: BC0 GSM: 900/1800MH
1	EC25-AFX	North America	LTE-FDD: B2/B4/B5/B12/B13/B14/B66/B71 LTE-TDD: / WCDMA: B2/B4/B5 GSM/EDGE: /
2	EC25-AUX	Latin America / Australia / New Zealand	LTE-FDD: B1/B2/B3/B4/B5/B7/B8/B28 LTE-TDD: B40 WCDMA: B1/B2/B4/B5/B8 GSM/EDGE: B2/B3/B5/B8
3	EC25-EUX	EMEA / Thailand	LTE-FDD: B1/B3/B7/B8/B20/B28A LTE-TDD: B38/B40/B41 WCDMA: B1/B8 GSM/EDGE: B3/B8

5.4 GNSS

GNSS module performance parameters:

Parameter	Description
Default galaxy configuration	GPS + BeiDou
Frequency band	GPS L1 C/A: 1575.42 ±1.023 MHz BeiDou B1I: 1561.098 ±2.046 MHz GLONASS L: 1597.78~1605.66 MHz
Receiving sensitivity (GPS+BeiDou)	Capture: -147 dBm Re-capture: -159 dBm Track: -162 dBm
TTFF (AGNSS on, real network 500 Average value of secondary test)	Cold reboot: 5.5 s Warm start: 2 s Reset: 2 s
TTFF (AGNSS off, real network 500 Average value of secondary test)	Cold reboot: 30 s Warm start: 2 s Reset: 2 s
Horizontal position accuracy (autonomous)	<2.0m CEP, 50%, Static for 2 hours, -130 dBm, More than six satellites
Refresh rate	The default is 1 Hz, and the maximum is 5 Hz.
1PPS Signal accuracy	Typical accuracy: < 30 ns Pulsewidth: 100 ms
Speed accuracy	<0.1 m/s
Dynamic property	Acceleration: 4G
UART port	Default baud rate: 9600 bps Used for command input and NMEA statement output.

GPS module power consumption parameters:

Vcc=3.3V@-130 dBm

Parameters	GPS	GPS+BeiDou	GPS+GLONASS
Capture (mA)	23	26	26
Track (mA)	23	26	26
Standby (uA)	20	20	20
Backup (uA)	8	8	8

5.5 Antenna

5.5.1 Wi-Fi / BT Antenna

Parameter	Feature
Antenna type	External antenna
Frequency band	2400MHz ~ 2500MHz, 5150MHz ~ 5850 MHz
Antenna gain	2 dBi
Impedance	50 OHM

5.5.2 4G LTE Antenna

Parameter	Feature
Antenna type	External antenna
Frequency band	LTE-FDD, LTE-TDD
Frequency range	698MHz ~ 894MHz, 1710MHz ~ 2200MHz, 2496MHz ~ 2690MHz
Antenna gain	2 dBi
Impedance	50 OHM

5.5.3 GNSS Antenna

Parameter	Feature
Antenna type	External antenna
Frequency band	1559MHz ~ 1609MHz
Antenna gain	2 dBi
Impedance	50 OHM

5.5.4 LoRa Antenna

868MHz Antenna

Parameter	Feature
Antenna type	External antenna
Frequency band	863MHz ~ 870MHz
Antenna gain	2 dBi
Impedance	50 OHM

915MHz Antenna

Parameter	Feature
Antenna type	External antenna
Frequency band	902MHz ~ 928MHz
Antenna gain	2 dBi
Impedance	50 OHM

470MHz Antenna

Parameter	Feature
Antenna type	External antenna
Frequency band	470MHz ~ 510 MHz
Antenna gain	2 dBi
Impedance	50 OHM

6 Electrical Characteristics

6.1 Electrical Parameters

Parameters	Minimum	Typical	Max	Unit
System power input	40	48	57	V
Working temperature	-25	/	60	°C
Storage temperature	-25	/	60	°C
Working environment humidity	0	/	90	%

7 About Us

7.1 About EDATEC

EDATEC, located in Shanghai, is one of Raspberry Pi's global design partners. Our vision is to provide hardware solutions for Internet of Things, industrial control, automation, green energy and artificial intelligence based on Raspberry Pi technology platform.

We provide standard hardware solutions, customized design and manufacturing services to speed up the development and time to market of electronic products.

7.2 Contact Us

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