

Chirp

WisGate Edge Pro

Version 2 (RAK7229CV2)

Datasheet

Overview

Description

RAK7229CV2 WisGate Edge Pro is the latest edition of the RAK Edge Series. It is an ideal product for IoT commercial deployment. With its industrial-grade components, it achieves a high standard of reliability. The RAK7229CV2 supports Sub-GHz LoRa and 2.4 GHz LoRa, and multi-backhaul with Ethernet, Wi-Fi, and Cellular connectivity.

RAK7229CV2 is also equipped with a Bluetooth module for additional user interaction and additional hardware encryption capabilities.

Its enclosure is designed to allow the Bluetooth, LTE, Wi-Fi, and GPS antennas to be inside the enclosure. Optionally, there is a dedicated port for different power options, solar panels, and batteries.

The RAK7229CV2 supports WisGateOS 2, which is based on the latest OpenWRT kernel and accommodates the latest security updates like IPv6, OpenSSL 1.1 support, multiple accounts access, and more. The web UI has a fresh new look, with more user-friendly information tooltips.

WARNING

This product is designed to be powered by 12 VDC via a dedicated power port. The use of solar chargers is prohibited, as they may provide overvoltage and cause damage to the device. We strongly advise against using such chargers with this product, and any damage resulting from their use will void the warranty.

Features

Hardware

- IP67/NEMA-6 industrial-grade enclosure with cable glands
- PoE (802.3af) + Surge Protection
- Dual LoRa Concentrators for Sub-GHz and 2.4 GHz
- Backhaul: Wi-Fi, Ethernet, LTE

- GPS
- Supports DC 12 V or solar power supply with electricity monitoring (Solar Kit optional)
- Internal antenna for Wi-Fi, GPS, LTE, and Bluetooth
- External antenna for LoRa
- Dying-gasp (optional)
- Bluetooth
- Hardware encryption

Software

- Built-in Network Server (full LoRaWAN support V 1.0.3)
- OpenVPN
- Software and UI sit on top of OpenWRT
- Full LoRaWAN Stack support with Semtech SX1303
- LoRa Frame filtering (node whitelisting)
- MQTT v3.1 bridging with TLS encryption
- Buffering of LoRa frames in Packet Forwarder mode in case of NS outage (no data loss)
- Listen Before Talk (optional)
- Fine timestamping (optional)

Specifications

Overview

The overview presents the block diagram for the RAK7229CV2 that shows the internal architecture of the board and the main specifications.



Figure 1: Overview

Main Specifications

Feature	Specifications
Computing	MT7628, DDR2 RAM 128 MB
Wi-Fi feature	Frequency: 2.4 GHz (802.11b/g/n) 2x2 MIMO RX Sensitivity: -95 dBm (Min) TX Power: 20 dBm (Max) Operation channels: 2.4 GHz: 1-13
Sub-GHz LoRa feature	SX1303 mini PCIe card 8 channels RX Sensitivity: -139 dBm (Min) TX Power: 27 dBm (Max) Listen Before Talk
2.4 GHz LoRa feature	SX1280 mini PCIe card 8 channels RX Sensitivity: -132 dBm (SF12 BW 203 kHz); -110 dBm (SF7 BW 1625 kHz) TX Power: 27 dBm (Max)
Bluetooth feature	BLE5.0 (Tx power -20 to +4 dBm in 4 dB steps)
Hardware encryption feature	ECC608A
Frequency	EU433/CN470/EU868/US915/AS923/AU915/IN865/KR920 2.4 GHz LoRa
Cellular feature	Supports Quectel EG95-E/EG95-NA (IoT/M2M -optimized LTE Cat 4 Module) EG95-E for EMEA Region (Europe, Middle East, and Africa) LTE FDD: B1/B3/B7/B8/B20/B28A WCDMA: B1/B8 GSM/EDGE: B3/B8 EG95-NA for North America Region LTE FDD: B2/B4/B5/B12/B13 WCDMA: B2/B4/B5
Power supply	PoE (IEEE 802.3af) - 37~57 VDC
ETH	RJ45 (10/100 M)
Antenna	LoRa: 1 or 2 N-Type connectors LTE: Internal antenna Wi-Fi: Internal antenna
Ingress protection	IP67
Enclosure material	Aluminium and plastic

Feature	Specifications
Operating temperature	-30 °C to +55 °C
Installation method	Pole or wall mounting

Hardware

The hardware specification covers the interfacing of the RAK7229CV2 and its corresponding functionalities. It also presents the parameters and the standard values of the gateway.

RF Specifications

Wi-Fi Radio Specifications

Parameter	Value
Wireless standard	IEEE 802.11b/g/n
Operating frequency	ISM band: 2.412~2.472 GHz
Operation channels	2.4 GHz: 1-13
Transmit power (The max power may be different depending on local regulations) - per chain	802.11b 19 dBm @1 Mbps 19 dBm @11 Mbps 802.11g 18 dBm @6 Mbps 16 dBm @54 Mbps 802.11n (2.4 G) 18 dBm @MCS0 (HT20) 16 dBm @MCS7 (HT20) 17 dBm @MCS0 (HT40) 15 dBm @MCS7 (HT40)

Parameter	Value
Receiver sensitivity (Typical)	802.11b -95 dBm @1 Mbps -88 dBm @11 Mbps 802.11g -90 dBm @6 Mbps -75 dBm @54 Mbps 802.11n (2.4 G) -89 dBm @MCS0 (HT20) -72 dBm @MCS7 (HT20) -86 dBm @MCS0 (HT40) -68 dBm @MCS7 (HT40)

LoRa Sub GHz Radio Specifications

Parameter	Value
Operating Frequency	EU433/CN470/EU868/US915/AS923/AU915/IN865/KR920
Transmit Power	27 dBm (Max)
Receiver Sensitivity	-139 dBm (Min)

LoRa 2.4 GHz Radio Specifications

Parameter	Value	Condition
Tx power	Max: 27 dBm	-
Receiver sensitivity	-132 dBm -110 dBm	SF12 BW 203 kHz SF7 BW 1625 kHz

Interfaces



Figure 3: Interfaces

- The function of the Reset key is as follows:

- **Short press:** Restart the gateway.
- **Long press** (5s and above): Restore factory settings.
- LEDs status description:

LEDs	Status indication description
LED 1 (PWR)	Power indicator - The LED is on when device power is on
LED 2 (ETH)	ON - Linkup OFF - Linkdown Flicker - Data transmitting and receiving
LED 3 (LoRa 1)	ON - LoRa 1 is working OFF - LoRa 1 is not working Flicker - Indicate LoRa 1 Packet receiving and sending
LED 4 (WLAN)	AP Mode: - ON - The AP is up - Flicker - Data receiving and sending STA Mode: - Slow flicker (1 Hz) - Disconnected - ON - Connected - Flicker - Data receiving and sending
LED 5 (LTE)	Slow Flicker (1800 ms High / 200 ms Low) - Network searching Slow flicker (200 ms High / 1800 ms Low) - Idle Fast flicker (125 ms High / 125 ms Low) - Ongoing data transfer ON - Voice is working
LED 6 (LoRa 2 for 2.4 GHz LoRa)	ON - LoRa 2 is working OFF - LoRa 2 is not working Flicker - Indicate LoRa 2 Packet receiving and sending

Dimensions

Enclosure Dimensions

1. Enclosure body
2. Enclosure lid

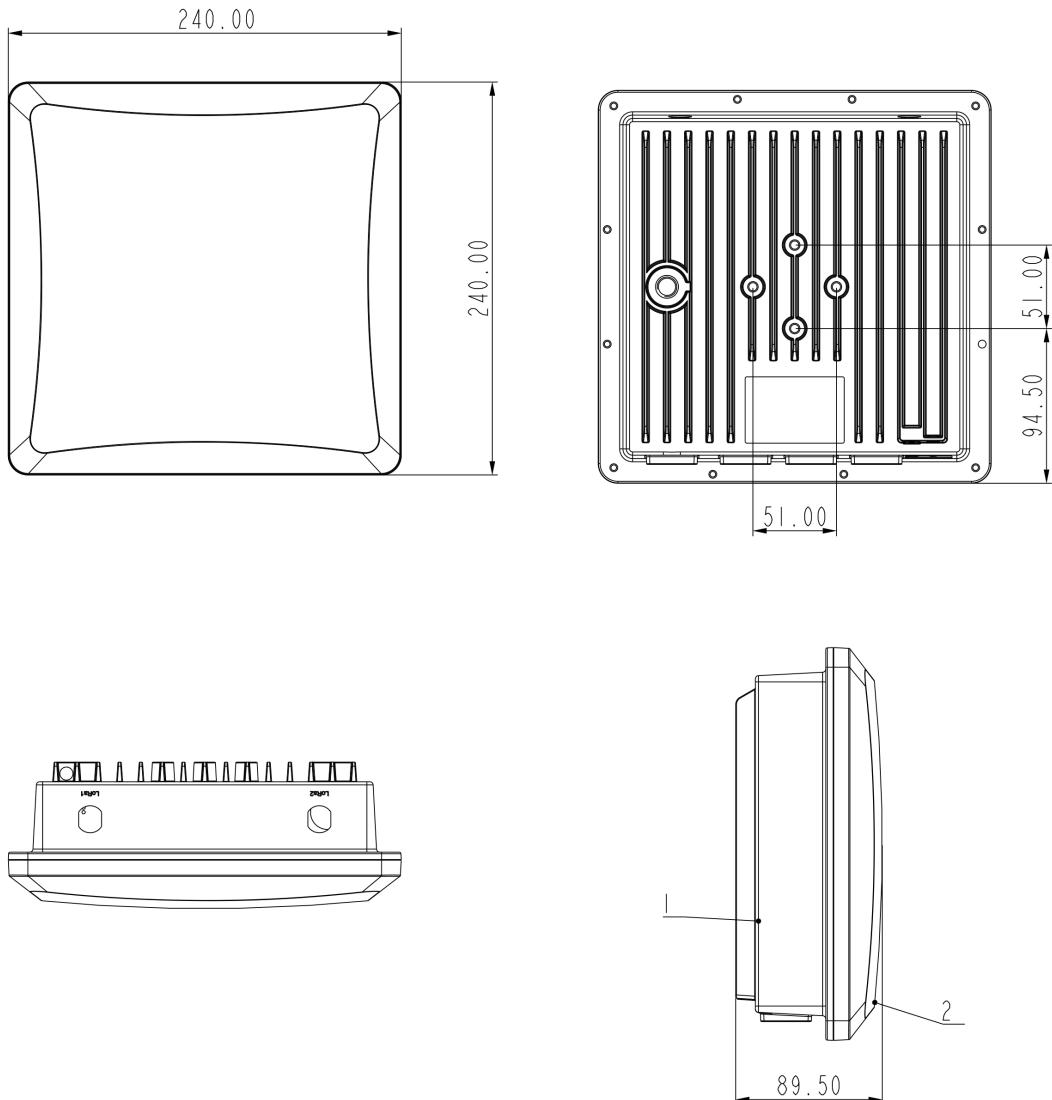


Figure 4: Enclosure dimensions

Mounting Kit Dimensions

1. 2x Bolt M8x140
2. 8x Nut M8
3. 6x Screw M6x12
4. 2x Spring washer M8
5. 2x Flat washer M8
6. 1x Mounting plate
7. 1x Mounting bracket
8. 1x Pole mount bracket

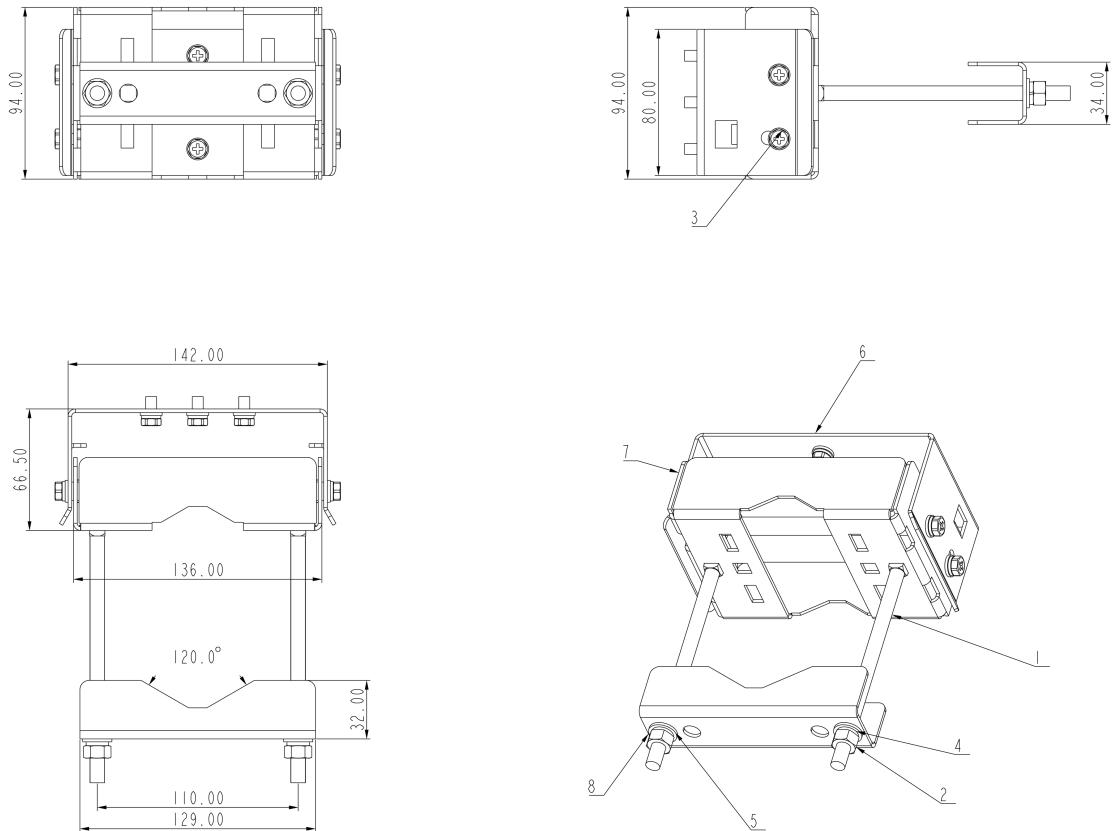


Figure 5: Mounting kit dimensions

Software

Firmware

The firmware sits on top of OpenWRT. There is a Web UI for easy configuration and management of the device and the possibility for SSH2 management. The WisGateOS 2 supports the feature to install extensions (WireGuard, Custom Logo, Breathing Light, and more to come). The extensions are available in the [RAK download center](#).

Model	Firmware Version	Source
RAK7229CV2 WisGate Edge Pro	WisGateOS 2	Download

Software Features

LoRa	Network	Management
Gateway OTA management	Wi-Fi AP mode	WisDM
LoRa package forward (Packet Forwarder, Basics Station)	Wi-Fi Client mode	SSH2, NTP
Frequency band setup	LTE APN Setup	Firmware update
Country code setup	802.1q	WEB UI
TX power setup	Uplink backup	LoRa Packet Forwarder

LoRa	Network	Management
Data logger	Support 802.1q	Built-in Network Server
Location setup	Firewall	MQTT Bridge
Statistic	DHCP Server/Client	OpenVPN, Ping Watch Dog
Supports class A, B, C		
Server address and port setup		

FCC:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution:

Changes or modifications not expressly approved by the part responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC RF Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 40cm between the radiator and any part of your body.

ISED:

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The device complies with RF exposure guidelines, users can obtain Canadian information on RF exposure and compliance. The minimum distance from the body to use the device is 40 cm.

Le présent appareil est conforme Après examen de ce matériel aux conformité ou aux limites d'intensité de champ RF, les utilisateurs peuvent sur l'exposition aux radiofréquences et la conformité and compliance d'acquérir les informations correspondantes. La distance minimale du corps pour utiliser l'appareil est de 40 cm.

The device must be installed by a trained professional (training in RF Exposure) to ensure that the device is installed correctly with all safeguards in place.

L'appareil doit être installé par un professionnel qualifié (formation en exposition RF) pour s'assurer que l'appareil est installé correctement avec toutes les protections en place.