RAK7289 WisGate Edge Pro Datasheet

Overview

Description

RAK7289 WisGate Edge Pro is an ideal product for IoT commercial deployment. With its industrial-grade components, it achieves a high standard of reliability.

Supports up to 16 LoRa channels, multi-backhaul with Ethernet, Wi-Fi, and Cellular connectivity. Optionally there is a dedicated port for different power options, solar panels, and batteries. With its new enclosure design, it allows the LTE, Wi-Fi, and GPS antennas to be inside the enclosure.

The gateway provides a solid out-of-the-box experience for quick deployment. Additionally, since its software and UI sits on top of OpenWRT it is perfect for the development of custom applications (via the open SDK).

Thus, the RAK7289 is suited for any use case scenario, be it rapid deployment or customization with regards to UI and functionality.

Product Features

Hardware

- **IP67/NEMA-6** industrial-grade enclosure with cable glands
- **PoE (802.3af)** + Surge Protection
- Dual LoRa Concentrators for up to **16 channels**
- **Backhaul:** Wi-Fi, LTE, and Ethernet
- GPS
- Supports DC 12 V or Solar power supply with Electricity monitoring (Solar Kit optional)
- Internal antenna for Wi-Fi, GPS, and LTE, External antenna for LoRa
- Dying-Gasp (optional)

Software

- Built-in Network Server
- OpenVPN
- Software and UI sit on top of **OpenWRT**
- LoRaWAN 1.0.3
- **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)
- **Full duplex (optional)**
- **Listen Before Talk (optional)**
- **Fine timestamping (optional)**

Specifications

Overview

The overview presents the block diagram for the RAK7289 that shows the internal architecture of the board.

Block Diagram

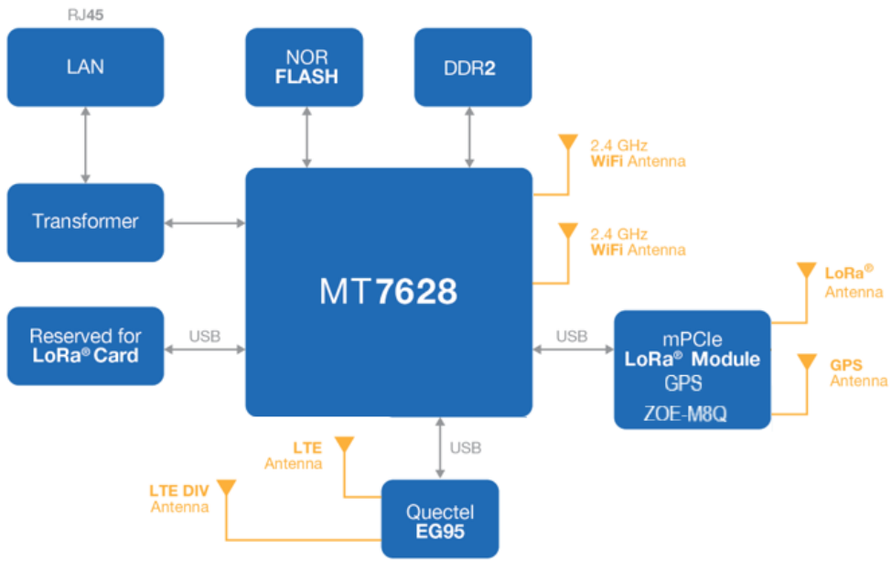

Figure 1: RAK7289 WisGate Edge Pro Block Diagram

Main Specifications

Feature	Specifications
Computing	MT7628, DDR2 RAM 128 MB
Wi-Fi feature	Frequency: 2.4 GHz (802.11 b/g/b/)
	2x2 MIMO
	RX Sensitivity: -95 dBm (Min)
	TX Power: 20 dBm (Max)
	Operation channels: 2.4 GHz: 1-13
LoRa feature	SX1303 mPCIe card (connects maximum of two)
	8 Channels (16 channels optional)
	RX Sensitivity: -139 dBm (Min)
	TX Power: 27 dBm (Max)
	Listen Before Talk
Frequency	EU433/CN470/EU868/US915/AS923/AU915/IN865/KR920
Cellular feature	Supports Quectel EG95-E/EG95-NA (IoT/M2M -optimized LTE Cat 4 Module)
	EG95-E for EMEA Region
	- 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 802.3 af), 37~57 VDC
ETH	RJ45 (10/100 Mbps)
Antenna	LoRa: 1 or 2 N-Type connectors
	LTE: Internal antenna

Feature	Specifications
	Wi-Fi: Internal antenna
Ingress protection	IP67
Enclosure material	Aluminum and plastic
Operating temperature	-30° C to +55° C
Operating humidity	0-95% RH non-condensing
Installation method	Pole or wall mounting

Hardware

The hardware specification covers the interfacing of the RAK7289 and its corresponding functionalities. It also presents the parameters and the standard values of the board.

RF Specifications

Wi-Fi Radio Specifications

Feature	Specifications
Wireless Standard	IEEE 802.11 b/g/n
Operating Frequency	ISM band: 2.412~2.472 (GHz)
Operation Channels	2.4 GHz: 1-13
Transmit Power (The max power maybe 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 (2.4G)
	18 dBm @MCS0 (HT20)
	16 dBm @MCS7 (HT20)
	17 dBm @MCS0 (HT40)
	15 dBm @MCS7 (HT40)
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 (2.4G)
	-89 dBm @MCS0 (HT20)
	-72 dBm @MCS7 (HT20)
	-86 dBm @MCS0 (HT40)

Feature	Specifications
	-68 dBm @MCS7 (HT40)

LoRa Radio Specifications

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

Interfaces

Figure 2: RAK7289 WisGate Edge Pro 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 16 channel)	ON - LoRa 2 is working
	OFF - LoRa 2 is not working
	Flicker - Indicate LoRa 2 Packet receiving and sending

Firmware

The firmware sits on OpenWRT, which makes it possible to customize it. There is a Web UI for easy configuration and management of the device, as well as the possibility for SSH2 management.

Model	Firmware Version	Source
RAK7289 WisGate Edge Pro	WisGateOS V1.3.9	Download

Software

Software Features

LoRaWAN	Network	Management
Supports class A, B, C	Wi-Fi AP mode	WEB UI
LoRa package forward	Wi-Fi Client mode	SSH2, NTP
Frequency band setup	LTE APN setup	Firmware update
TX power setup	Uplink backup	LoRa packet forwarder
Data logger	Support 802.1q	Built-In Network Server
Statistic	DHCP Server/Client	OpenVPN, Ping Watch Dog
Location setup	Firewall	MQTT Bridge
Server address and port setup		

Models/Bundles

Part Number	8 Channel SX1303	16 Channel SX1303	Cat4 Cellular	GPS	Wi-Fi	Dying gasp
RAK7289-XYZ	√		√	√	√	
RAK7289-XYZ		√	√	√	√	
RAK7289-XYZ	√		√	√	√	√
RAK7289-XYZ		√	√	√	√	√
RAK7289-XYZ	√			√	√	
RAK7289-XYZ		√		√	√	
RAK7289-XYZ	√			√	√	√
RAK7289-XYZ		√		√	√	√