



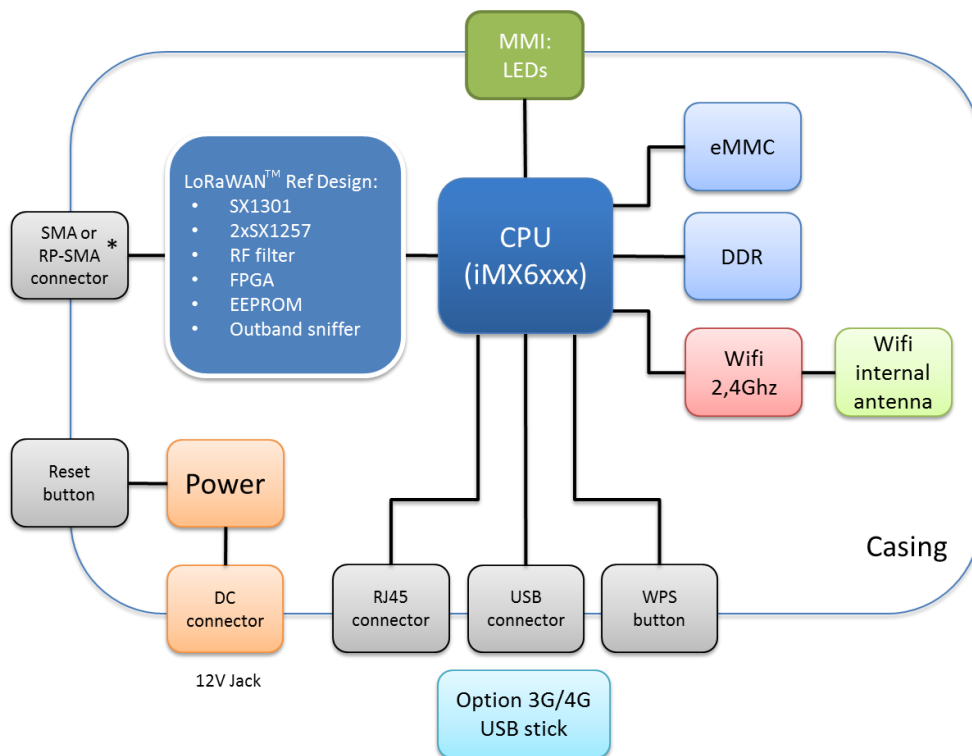
## Wirnet™ iFemtoCell

Indoor LoRaWAN™ gateway for smart IoT chain

- Unlicensed band Long Range (LoRa®) bidirectional communications capabilities
- Supported bands: 863-873MHz, 902-928MHz, 915-928MHz (depending on the version)
- Backhaul connectivity Ethernet, Wifi or 3G/4G modem (in option)
- Highly secured device relying on a hardware secure core

### 1. Hardware Key Features

#### 1.1 Hardware block diagram



\* SMA for 868 MHz version and RP-SMA for 915 MHz and 923 MHz versions

## 1.2 CPU Module

### 1.2.1 System

#### CPU:

- Based on ARM Cortex A9 core processor (up to 800MHz)
- Hardware watchdog
- Optimized power consumption management
- Embedded hardware secure core

#### Volatile Memory:

- DDRAM 256MB

#### Non-volatile Memory:

- 8GB eMMC

### 1.2.2 User interface

#### External LEDs:

- Operational status: power, backhaul, LoRa®™ RF activity

#### External push buttons:

- Reset
- WPS

#### USB host interface allowing:

- Local secured software upgrade with simple USB stick
- External 3G/4G modem

#### Web local interface allowing:

- Configuration

### 1.2.3 Communication

#### Ethernet:

- Ethernet 10/100 Base-T compliant

#### WLAN:

- Chipset 2.4GHz
- Internal antenna without diversity
- Client and adhoc mode, AP mode
- WPS

#### WWAN:

- Optional, by connecting a 3G/4G modem dongle on the external USB connector

## 1.2.4 Power

- Power supply 230VAC/12VDC with provided jack connector

## 1.3 LoRa®™ capabilities

- Incorporate LoRa®™ bidirectional communication technology
- 49 LoRa®™ Demodulators over 9 channels

### Provided Antenna:

- Type: omnidirectional
- Gain: 3dBi
- Size: 135.6x20.1 mm

### 1.3.1 868 MHz version

#### Capabilities:

- RX range: 863-873 MHz
- TX range: 863-873 MHz
- Sensitivity: up to -141 dBm
- Tx conducted power from 0dBm to +27dBm

### 1.3.2 923 MHz version

#### Capabilities:

- RX range: 915-928 MHz
- TX range: 915-928 MHz
- Sensitivity: up to -141 dBm
- Tx conducted power from 0dBm to +27dBm

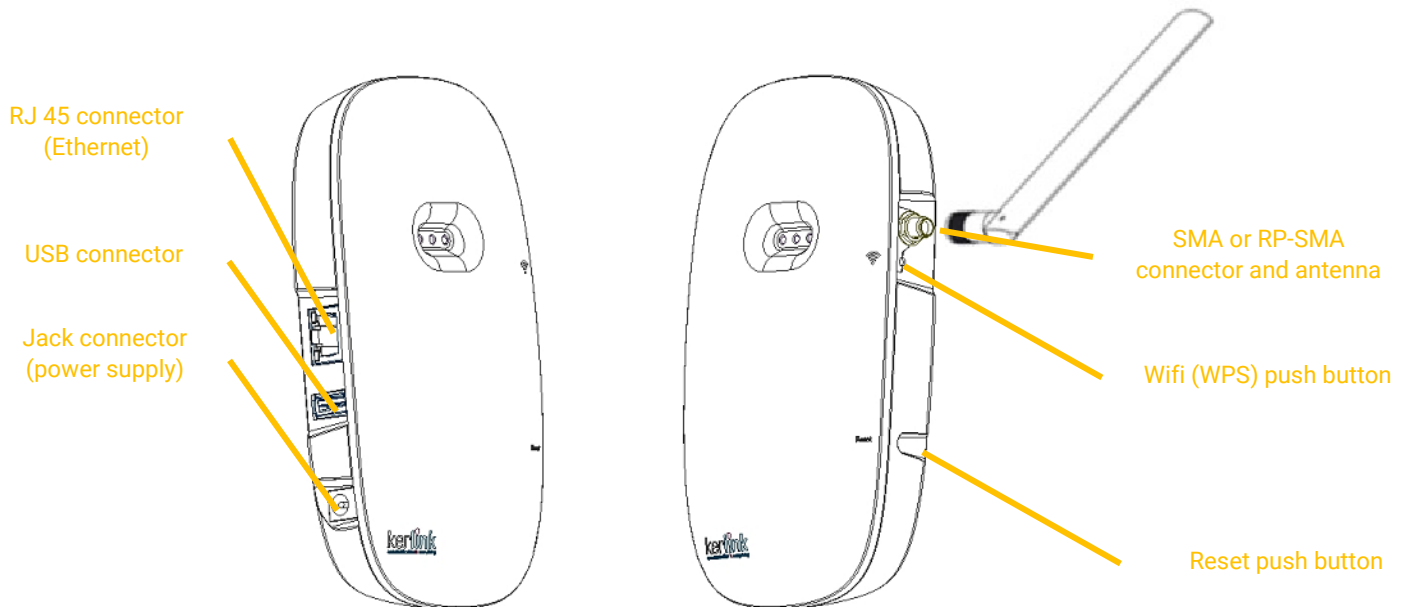
### 1.3.3 915 MHz version

#### Capabilities:

- RX range: 902-928 MHz
- TX range: 902-928 MHz
- Sensitivity: up to -141 dBm
- Tx conducted power from 0dBm to +27dBm

## 2. Mechanical

- Plastic enclosure
- Dimensions: [max] 160 x 90 x 35 mm
- Weight: less than 500g
- Connectors:
  - o RJ45 (Ethernet 10/100)
  - o SMA or RP-SMA for LoRa®™
  - o Jack 2.5mm/5.5mm for power supply
  - o USB type A



### 2.1 Mounting

- Wall mounting by 2 oblong holes
- Lay on a table (4 domes)

### 2.2 Environmental

- Full operating range: - 20° to +55°C (for gateway only, without power supply)
- Humidity: 5% to 95%
- Ingress protection: IP30
- For indoor use only
- Flammability rating: UL94-V0

## 3. Software key features

### 3.1 Operating system

- Based on Yocto/Poky 2.1
- Standard Long-Term Support Linux version 4.1
- File system: EXT4, Squashfs
- Support of all GNU/Linux tools (cross-compiled for ARM)
- TCP/IP BSD4.4 socket on network bearer

### 3.2 Software packages included (non-exhaustive)

- Embedded Base Station Controller (BSC)
- LoRa® packet Forwarder
- LoRa® test tools
- Python
- Busybox
- Ntp

#### Networking:

- DHCP client
- Firewalling (iptables) and IP routing (layer 3)
- OpenVPN
- IPSEC (StrongSwan)
- Connman
- Ofono

### 3.3 Software security

- Secure boot (software authentication and integrity control) relying on a hardware secure core
- Critical information storage (private keys, certificates...) inside a hardware secure core
- Critical software execution protection (encryption, decryption,) relying on a Trust zone embedded inside a hardware secure core
- Firewall
- Read Only file system preventing unexpected file system corruption
- Software auto-recovery mechanism to protect against software update failure
- Secured firmware upgrade (USB stick or over the air)

### 3.4 BSC services

BSC (Base Station Controller) interfaces are relying on standard SNMP (v2c) protocol and provide the following services:

- Alarm notifications
- Firmware upgrade

- File transfer
- Remote shell control
- Configuration
- Monitoring (platform statistics, RF statistics, RF spectrum analyzer...)

The BSC interface is secured through an SSL tunnel (openVPN)

### 3.5 Software development tools

- C/C++ Linux cross compilation toolchain based on GNU tools (GCC 5.3.0, Glibc 2.23)
- On-line wiki

### 4. Certifications (according to radio frequency)

- CE
- FCC/IC on going
- Specific countries on demand



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