

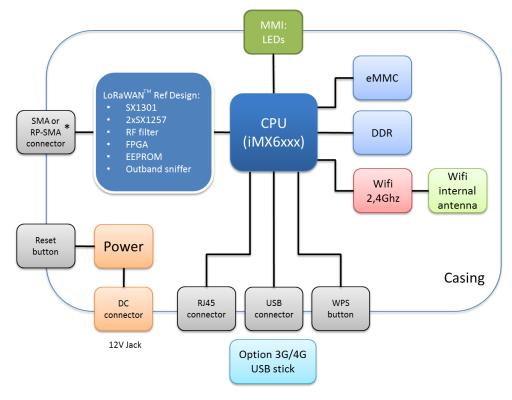
# Wirnet™ iFemtoCell

# 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 MHzTX range: 863-873 MHzSensitivity: up to -141 dBm

- Tx conducted power from 0dBm to +27dBm

#### 1.3.2 923 MHz version

#### **Capabilities:**

RX range: 915-928 MHzTX range: 915-928 MHzSensitivity: up to -141 dBm

- Tx conducted power from 0dBm to +27dBm

#### 1.3.3 915 MHz version

#### Capabilities:

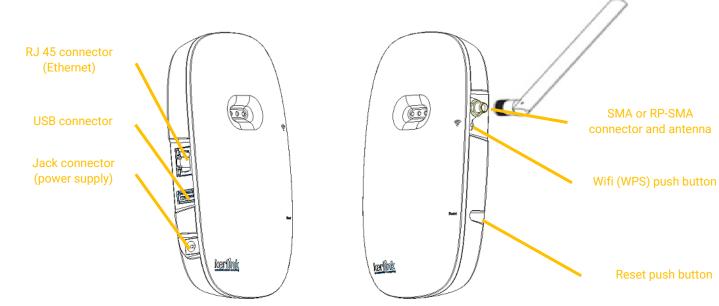
RX range: 902-928 MHzTX range: 902-928 MHzSensitivity: up to -141 dBm

- 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 begrer

#### 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)

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



