GATEWAY (CLAC)

Application

The gateway for electronic water meters mettering (CLAC) is a device UNE-82326:2010 bus compatible with LPWA communications NBIoT.

It is able to execute bus reading cycles and capture A/A+ packets up to 50 water meters and transmmit them directly to the cloud.

Characteristics

- Battery powered. External powering not required.

- Wireless NBIoT communications.

- UNE-82326:2010 compatible.

- Real time clock

- Manual presential reading.

- Remote modem and device FW update.

- Debug port.

- Process information internal Leds.

- Full compatible with mobile phone operators.

- Configurable operation modes.

Box

Box	Polycarbonate outdoor and UV resistant IP67.
Siza	162 x 82 x 55 mm
Weight	500 gr

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Powering

The device is powered exclusively by batteries.
Battrey pack is not sordered or fastened. It is connected by a JST PH type connector 2 pins female (see figure 7) so it is easy to change for a new one.

battery connector

Thte batery pack is 3.6V and 14Ah
Annual self discharge rate: 2%
Tempertarure ragne of use: -55ºC to 85ºC
Non-flammable electrolyte
Security standard IEC-86-4 and IEC 60086-4 compliant
Stainless Steel type 304 container.
Hermetecally sealed.

EXPECTED AUTONOMY

Considering a reading of 15 water meters, less than one month operation, A/A+ packages every one hour and a daily transmision window for 24 data for each meter, the expected battery life will agree the following chart.

Coverage Enhance Level	Life Battery (LB)
0	7,0
1	6,5
2	4,0

To comply with this parameters the following parameters must be taken: T3324: 180s, T3412: 1h.

Wiring

A 1.5m RJ-11 male wire acording to UNE-82326:2010 is aviable. This wire go across the box throug a gland to garantee IP67 protection.

Inside the box, it is connected to a 6 poles connector in an easy way.

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Operation modes

CASO A
Periodic operation

The CLAC allow up to 8 readings in one operation day. Each reading can be especified in the reading settings: start time, end, cyclic period of the reading (from 5 minutes to 24 hours).
The CLAC allow also to set up to 8 windows of daily transmision. User can specify the start time to connect and upload the data.

Each TX windows individually can also:

-Change reading parameters
-Manage the configuration data of the CLAC and reset the stadistic counters
-Manage autentication credentials of the CLAC.
-Enable or disable the reed sensor to force the local reading.
-Start a firmware upgrade

Every communication is acknowledge with a level application ACK sending. CLAC device can store in its non volatil memory all meter data not confirmed by the middleware.
To save battery, TX windows are limited to 10 minutes and a maximun of 3 connection retry to NBIoT and autentication.

Caso B
Presential manually forced operation

If this setting is enabled, the reed sensor can be activated with a magnet and force a basic reading of the bus and a sending of data.

Sended parameters

The CLAC calculate and send the following data:	Last CEL registered.
FW version of CLAC and modem.	Total number of NBIoT succesful connections.
Total readings executed in the UNE-82326:2010 bus.	Total number of NBIoT not completed connections.
Total time (in seconds) of the reading operation of the bus UNE-82326:2010.	Total succesful connections to the middelware (retries included).
Total activations of the "Smart Reading" system against collinsions detected in the UNE-82326:2010 bus.	Total packets sended.
	Total packets re-sended because of remote ACK lack.
Last RSRP registered.	Total windows of TX executed.
Last RSRQ registered.	Total duration of TX windows.
Last SNR or equivalent registered.	Last Digital Input state of the presential sensor.
Last CellID resitered.	Mean RTT (round trip time).

WHEN WATER **COUNTS**

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Communications

NB-IoT

A NBIoT compatible with 3GPP NB1 Release 14.3.0 is equiped.
This modem is certified by the NBIot operators Telefónica and Vodafone. These approvals have been confirmed by the technicians of both operators and, in the Vodafone case, can be checked in the following link:
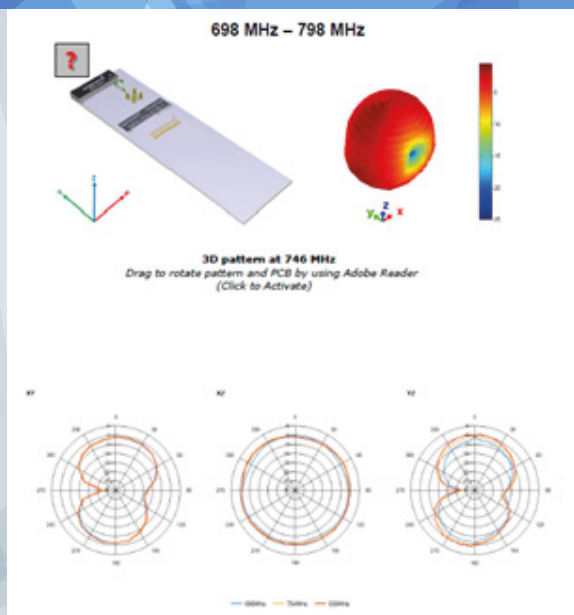https://www.vodafone.de/innovationpark/en/references.html

The modem has:

-FW upgraded by FOTA.
-Early Release capable.
- Posibility to register parameters of the NBIoT network as (RSRP, RSRQ, SNR, ECL and CellID)
-MCL (Maximum Coupling Loss) 164dB (worst case).
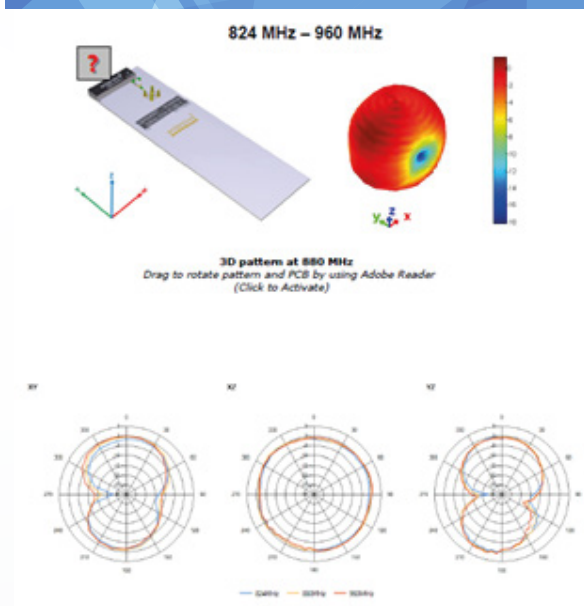-PSM and eDRX funcionalities.
Not attached to a network operator so it can work with different companies.
It has an inner Antenna soldered to the PCB. This antenna is tuned to the band 20 and has an omnidirectional diagram as it is showed in the pictures.

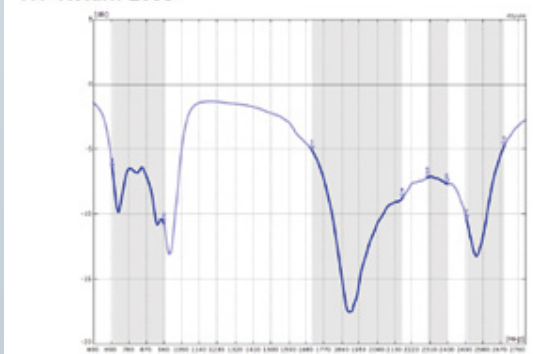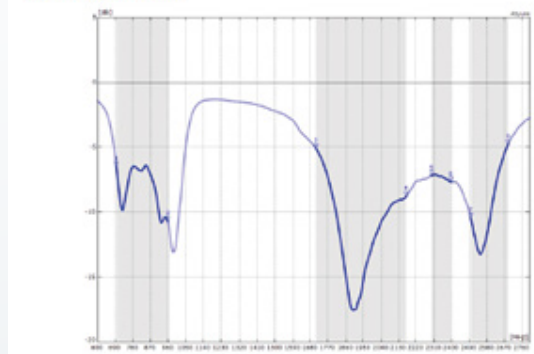| Frecuency band 698MHz-798MHz radiation diagram	Frecuency band 824MHz-960MHz radiation graph

Return Loss and Stationary wave relation grafhs

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GATEWAY

WHEN WATER COUNTS

CUANDO EL AGUA ES LO QUE CUENTA

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