



## Market Applications

- Smart cities
- Facility management
- Fuel and water distribution companies
- Industrial level monitoring
- Public buildings & infrastructure



## Key Advantages

- Install & Play
- Ease of installation / replacement / maintenance
- Maintenance free
- Data linearization mechanism
- Agile firmware architecture
- Integrated advanced data transfer limitation functions through compression
- Integrated advanced data reduction algorithms
- Configurable data throughput
- ~45KB /Month
- Random connection per day algorithm
- Network signal level monitoring
- Dynamic connection to the base station antenna with the best signal level
- 5+ years of battery life



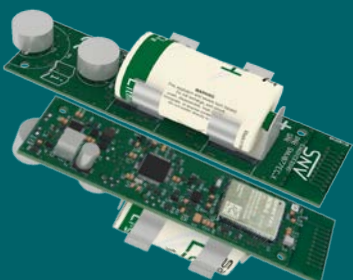
## Sensor (edge computing) Notifications & Alerts

Notifications (on each connection):

- Threshold level
- Battery level
- Network signal level

Alerts:

- Rapid level status change (leakage, refill)
- Motion detection
- Enclosure opened
- Low battery
- High temperature



NB-IoT

# Ultrasonic Sensor

## Level Monitoring



## Description

A robust ultrasonic sensor for level management in stationary diesel and water containers, rainwater pipelines and cesspools, with tilt detection capabilities for additional manhole monitoring. Powered by highly sophisticated intelligent firmware, this NB-IoT ultrasonic sensor can be installed in any type of plastic, metal or concrete tank (underground or above ground) to offer active level management with the lowest possible data throughput and battery life of 5+ years.



## Measurement Features

Measurement Accuracy	in range from 5cm to 2m: $\pm 15\text{mm}$
Nominal Tank Height	up to 4m
Measurement Period	default profile: every 15 minutes (configurable upon request)
Diesel Tank Level Output	Distance (between sensor and content surface) - Calibration, where necessary, to match content level with container capacity.



## Approvals

RoHS Compliant / CE



## Power

Battery	1 X SAFT LSH14 3.6v (Li-SOCl <sub>2</sub> ) - (replaceable)
Expected Battery Life	5+ Years [or 2300+ Network Connections] (default measurement profile: every 15min, 1 connection per 24h for the transmission of measurements, plus notifications/alerts)

Battery life depends on NB-IoT signal strength. The abovementioned prediction of expected battery life is made with NB-IoT signal strength of -80dBm RSSI (Received Signal Strength Indicator) and 150 SNR (Signal to Noise Ratio). The sensor automatically adjusts the transmitting (TX) power depending on the NB-IoT signal level. When the NB-IoT signal strength drops below -100dBm RSSI, a battery life reduction of up to 20% is expected. When the NB-IoT signal strength drops below -110dBm RSSI, battery life reduction can reach up to 30%.



## Communication

NB-IoT Module	Quectel BC95-G
Sensitivity	-129dBm $\pm 1\text{dB}$
NB-IoT Frequency Bands	B28 @H-FDD: 700MHz / B20 @H-FDD: 800MHz / B8 @H-FDD: 900MHz / B5 @H-FDD: 850MHz / B3 @H-FDD: 1800MHz
Data Transmission Period	Once per day (configurable upon request)
SIM Formats	Nano-SIM (4FF) / eSIM*



## Operational Features

Measurements Storage Capacity	up to 1 Year of measurements (default configuration)
Operational Temperature Range	-20°C to +75°C
Protocol	IPv4 - IPv6 / UDP / COAP* / LWM2M* / MQTT-SN*
Security	AES-ECC
Sensor Management	Bi-directional communication- Remote management of operating parameters (Device Management)
	Remote calibration / recalibration
	Over The Air Firmware Upgrade. The upgrade can take place over IPv4 or IPv6 networks, it is transported encrypted and the integrity of the firmware is verified on the sensor prior to installation.

\* Under Development / In Progress / In Planning

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### Physical Features

Sensor Dimensions	180mm x 66mm x 66mm (1 X $\Phi$ 55mm hole)
Sensor Weight	$\cong$ 300g + Battery 50g (SAFT LSH14)
IP Enclosure	IP 67



### Packing Contents

1 X	Ultrasonic Level Sensor
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### Warranty

12 Months	From the activation date (which should not exceed 6 months beyond the date of shipment)
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### Installation

Duration	15 - 25 minutes (depending on the specifics of the installation site, including the sensor's initialization procedure)
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### Upon Request

Battery	1 X SAFT LSH14 3.6v (Li-SOCI2)
Nominal Tank Height	up to 8m
NB-IoT Frequency Band	B1 @H-FDD: 2100MHz

