



## LoRaWAN product catalog

zTrack is the brand of ZANE systems LoRaWAN portfolio. These products are sensors, gateways, antennas, cables and everything that you need if you want to build your own LoRaWAN IOT ecosystem. The engineers at ZANE systems take their best efforts to make the things better, smarter. The content of this catalog is subject of change.

Document version 2.3

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# zTemp Temperature Sensor

## Features:

- 1xAA IMR 14500 3.6V battery (2600 mAh)
- adjustable operation interval by downlink message
- temperature measurement (0.1°C resolution)
- battery lifetime is 1-5 years depending on the intervals of measurements
- external temperature sensor (DS18B20)
- IP65 enclosure
- operation parameters can be set by downlink messages or zTrack setup application for Windows



## Payload structure:

TTTT, the values are ASCII characters between 0-9 for easy readability in decoded message

TTTT: Temperature, 1<sup>st</sup> digit: 0: positive temperature, 1: negative temperature

2<sup>nd</sup> digit: tens

3<sup>rd</sup> digit: ones

4<sup>th</sup> digit: tenths

Here is an example of 24.1°C: payload is: 0241

Another example of -4.1°C: payload is: 1041

## The zTemp manufacturing default settings:

- 5min temperature sending interval
- ABP authentication

## SPECIFICATIONS

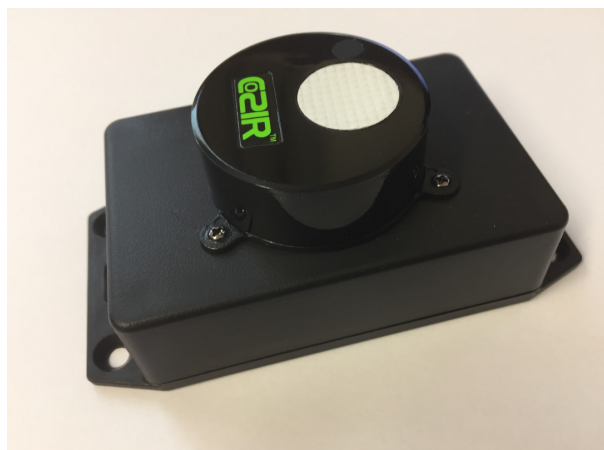
Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Dimensions	L:69 x W:14 x H:18.3mm (Weight: 110g)
Battery Specs	1xAA 3.6V battery	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temperature	-10°C - 50°	Accuracy	±0.3°C at 5-60°C (temperature) ±2% at 20-80% (humidity)

ZANE Temp is a product of ZANE systems Kft.

# Temperature, Humidity and CO2 sensor

## Features:

- 1xAA IMR 14500 3.6V battery (2600 mAh)
- adjustable operation interval by downlink message
- temperature measurement (0.1°C resolution)
- Relative Humidity measurement (1% resolution)
- CO<sub>2</sub> concentration measurement (PPM)
- battery lifetime is 1-5 years depending on the intervals of measurements
- operation parameters can be set by downlink messages or using zTrack setup application for Windows



## Payload structure:

TTTTTHCCCC, the values are ASCII characters between 0-9 for easy readability in decoded message

TTTT: Temperature, 1<sup>st</sup> digit: 0: positive temperature, 1: negative temperature

2<sup>nd</sup> digit: tens

3<sup>rd</sup> digit: ones

4<sup>th</sup> digit: tenths

HH: Relative Humidity 1<sup>st</sup> digit: tens

2<sup>nd</sup> digit: ones

CCCC: CO2 level 1<sup>st</sup> digit: thousands

2<sup>nd</sup> digit: hundreds

3<sup>rd</sup> digit: tens

4<sup>th</sup> digit: ones

Here is an example of 24.1°C, 54%RH, 1272PPM CO2: payload is: 0241541272

Another example of -4.1°C, 23%RH, 721PPM CO2: payload is: 1041230721

## SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Report interval (default)	5 minutes
Battery Specs	1xAA 3.6V battery	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temperature	-10°C - 50°C	Accuracy	±0.3°C at 5-60°C (temperature) ±2% at 20-80% (humidity)

LoRa Temperature, Humidity and CO2 sensor is a product of ZANE systems Kft.

# zDoor

A LoRaWAN sensor is built with reed switch or dry contact input terminal to detect opening and closing of doors, windows and gates. The sensor can report if any trigger occurs.

The device reports keep-alive signals. The period of this is adjustable by downlink message if needed. The range of it from 5min-1day. Operation parameters can be set by downlink messages or zTrack setup application for Windows.

When any trigger occurs, the device sends it immediately to the LoRaWAN network by unconfirmed message. The device reports reed opening/closing events.

If any trigger reports the device waits for the next attempt. Due to LoRaWAN regulations the device is waiting the specified time for next communication.

Battery lifecycle is subject of the number of daily reported messages. One set of good quality battery (2xAA) can send approx. 100.000 messages. In average usage it can be enough for several years.



The following parameters will be configurable via uUSB or downlink messages:

- LoRaWAN data rate
- Authentication mode (OTAA or ABP)
- Message type (confirmed or unconfirmed)

Optional features:

- Pulse counter (payload contains the pulses of a specified period)
- Accelerometer
- Magnetometer
- Temperature/humidity sensor

Payload specification:

Port 200

- 1 Byte XX
- Sent on power up, restart
- Contains firmware version

Port 207

- Keepalive message
- Sent 1/hour (default)
- Payload contains firmware version

Port 213

- 1 Byte 01 Sent on open
- 1 Byte 00 Sent on close
- if more sensors enabled, then the message will be extended by that

## SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Number of Channels	Configurable 8 channels (SKU-EU)
Battery Specs	2xAA 1.5V battery	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temperature	-10°C - 50°	Dimensions	L:69 x W:65 x H:19.3mm

zDoor is a product of ZANE systems Kft.

## zPir

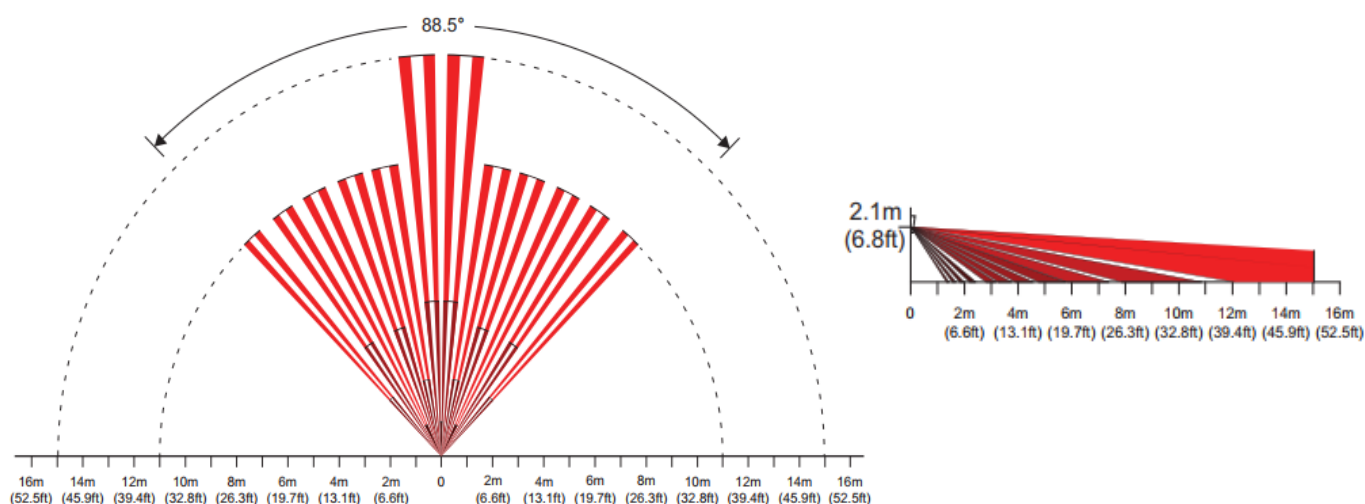
zPir is a PIR motion detector with built-in pet immunity, based on LoRaWAN communication. It operates with 3xAAA 1.5V standard batteries. When any movement occurs in the range of the detector it reports immediately to the LoRaWAN network with a message on port 213 the payload contains 01. Operation parameters can be set by downlink messages or zTrack setup application for Windows

Battery lifecycle is subject of the number of daily reported messages. One set of good quality battery can send more than. 10.000 messages. In average usage it works for several months.

If any trigger reports the device waiting for the next attempt. According to LoRaWAN regulations the device is waiting the specified time for next communication.



### Beam pattern



### SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Walk Speed	0.2m to 3.5m/s (0.6ft to 11.5ft/s)
Battery Specs	3xAAA 1.5V alkaline batteries	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temp. & Humidity	0°C to 50°C (32°F to 122°F) / 5 to 90% max.	Lens	2nd generation Fresnel lens, LODIFF® segments
Dimensions	6.5 x 12.5 x 5.2cm (2.5 x 4.9 x 2.0 in) (Weight: 110g)	Sensor Type	Dual rectangular element

zPir is a product of ZANE systems Kft.

# zWater

zWater is a LoRaWAN water sensing device, that reports to the LoRaWAN network when the resistance of the sensor drops caused by water. The message can be confirmed or unconfirmed based on the configuration.

The device reports keep-alive messages every hour to inform the user whether it is powered and operating properly.

Operation parameters can be set by downlink messages or using zTrack setup application for Windows.

It operates with 2xAA 1.5V standard alkaline batteries. The lifetime of the batteries depends on the number of sent messages.



The device contains a piece of cotton pads (diameter = 60mm, easy to get in any cosmetic shops). After water alarm the unit must be dried and the pads must be replaced before next usage.

The following parameters will be configurable via uUSB or downlink messages:

- LoRaWAN data rate
- Authentication mode (OTAA or ABP)
- Message type (confirmed or unconfirmed)

Payload specification:

Port 200

- 1 Bytes XX
- Sent on power up, restart
- Contains firmware version

Port 207

- Keepalive message
- Sent 1/hour (default)
- Payload contains firmware version

Port 213

- 1 Byte 01 Sent on water sensing

## SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Number of Channels	Configurable 8 channels (SKU-EU)
Battery Specs	2xAA 1.5V alkaline batteries	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temp. & Humidity	0°C to 50°C	Dimensions	L:75.6 x W:79.2 x H:32.5mm

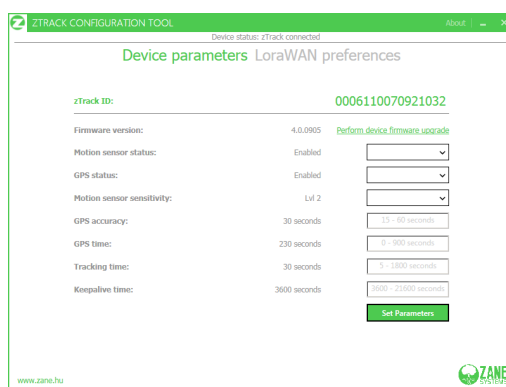
zWater is a product of ZANE systems Kft.

## zTrack Mini

**zTrack Mini** is a LoRaWAN based GPS tracking device for tracking various assets and the living with a rechargeable battery. The device is widely used to track pets, children, bicycles, elderly people, bags, assets.

### Operation of zTrack Mini

All zTrack trackers have an accelerometer and a temperature meter inside. The accelerometer chip is able to detect if the unit moves. If no movement is detected, the tracker sends keepalive packets to the gateway every 60 minutes by default (this period can be set from 5 minutes to 1 day). When movement is detected, the tracker activates itself start the GPS. If the GPS is able to locate the device the coordinates will be reported to the LoRaWAN network. If the GPS receives no coordinates within a specified time, then the module will only send a short message that motion happened. All of the messages contains the battery level and temperature. The device can be turned off via downlink messages or by the zTrack setup application for Windows.



### Battery Lifecycle:

**zTrack Mini** has 250mAh built in Li-po battery. This energy is enough to send 1000 messages with GPS coordinates. The tracker has a built-in accelerometer to detect movement, so the device uses the GPS only if motion is detected. The sending period and other operation parameter are adjustable by the user. In case of average usage (2 hours of motion per day with 5 minutes sending period) **zTrack Mini** can work for up to 4 weeks with one single charge. Charging is done via  $\mu$ USB cable and it takes 1 hour to fully charge the device.

## SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Number of Channels	Configurable 8 channels (SKU-EU)
Battery Specs	Rechargeable via uUSB 3.7V 250 mAh LiPo	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temperature	-10°C ~ 50°C	Protection Requirements	IP67
Dimensions	L:65 x W:24 x H:14mm (Weight: 25g)	LED indicator	Configurable (Activity, Charging)

zTrack Mini is a product of **ZANE systems Kft.**



# zTrack Midi

**zTrack Midi** is a LoRa based GPS tracking device for tracking various assets and the living with a replaceable battery in IP65 rated IEC529 (protection against dust and water jets) enclosure. The device is used for tracking assets, containers, animals such as cows, sheep, horses etc.

## Operation of zTrack Midi

All zTrack trackers have an accelerometer and a temperature meter inside. The accelerometer chip is able to detect if the unit moves. If no movement is detected, the tracker sends keepalive packets to the gateway every 60 minutes by default (this period can be set from 5 minutes to 1 day). When movement is detected, the tracker activates itself start the GPS. If the GPS is able to locate the device the coordinates will be reported to the LoRaWAN network. If the GPS receives no coordinates within a specified time, then the module will only send a short message that motion happened. All of the messages contains the battery level and temperature. The device can be turned off via downlink messages or by the zTrack setup application for Windows.

## Battery Lifecycle:

**zTrack Midi** has 2500mAh replaceable 3.6V AA battery. This energy is enough to send 10.000 messages with GPS coordinates. The tracker has a built-in accelerometer to detect movement, so the device uses the GPS only if motion is detected. The sending period and other operation parameter are adjustable by the user. In case of common usage (2 hours of motion per day with 5 minutes sending period) **zTrack Midi** can work for up to 1 year with a battery.



## SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Number of Channels	Configurable 8 channels (SKU-EU)
Battery Specs	Rechargeable via uUSB 3.7V 250 mAh LiPo	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temperature	-10°C ~ 50°C	Protection Requirements	IP65
Dimensions	L:93.6 x W:38.5 x H:18mm (Weight: 80g)	LED indicator	Configurable (Activity, Charging)

zTrack Midi is a product of **ZANE systems Kft.**



## zTag (under development, coming soon)

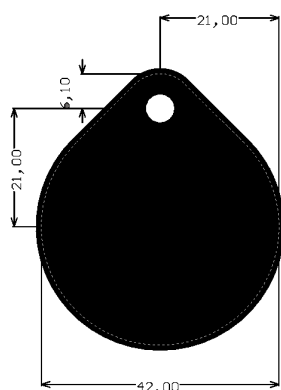
**zTag** is a very compact, lightweight, waterproof general purpose GPS tracker based on the LoRaWAN protocol, designed for tracking various assets: (e.g pets or even humans) It has built-in temperature sensor, and a 3-axis accelerometer to detect movement, saving power with this feature. It is powered by a 250mAh wireless rechargeable battery with Qi charger.

### Operation of zTag

The accelerometer chip is able to detect if the unit moves. If no movement is detected, the tracker sends keepalive packets to the gateway every 60 minutes by default (this period can be set from 5 minutes to 1 day). When movement is detected, the tracker activates itself start the GPS. If the GPS is able to locate the device the coordinates will be reported to the LoRaWAN network. If the GPS receives no coordinates within a specified time, then the module will only send a short message that motion happened. All of the messages contains the battery level and temperature. The device can be turned on/off via downlink messages.

### Battery Lifecycle:

**zTag** has 250mAh built in Li-po battery. This energy is enough to send 1000 messages with GPS coordinates. The tracker has a built-in accelerometer to detect movement, so the device uses the GPS only if motion is detected. The sending period and other operation parameter are adjustable by the user. In case of average usage (2 hours of motion per day with 5 minutes sending period) **zTag** can work for up to 4 weeks with one single charge. Charging is done via wireless Qi charger and it takes 1 hour to fully charge the device.



## SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Number of Channels	Configurable 8 channels (SKU-EU)
Battery Specs	Rechargeable via Qi charger 3.7V 250 mAh LiPo	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in
Operating Temperature	-10°C ~ 50°	Protection Requirements	IP69K
Dimensions	L:50 x W:43 x H:9mm (Weight: 25g)	LED indicator	Configurable (Activity, Charging)

zTag is a product of **ZANE systems Kft.**

# zCar

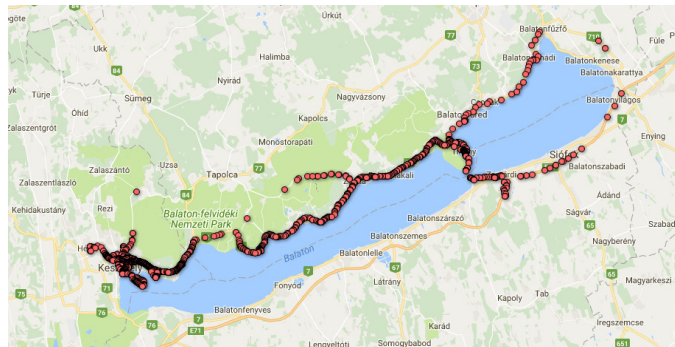
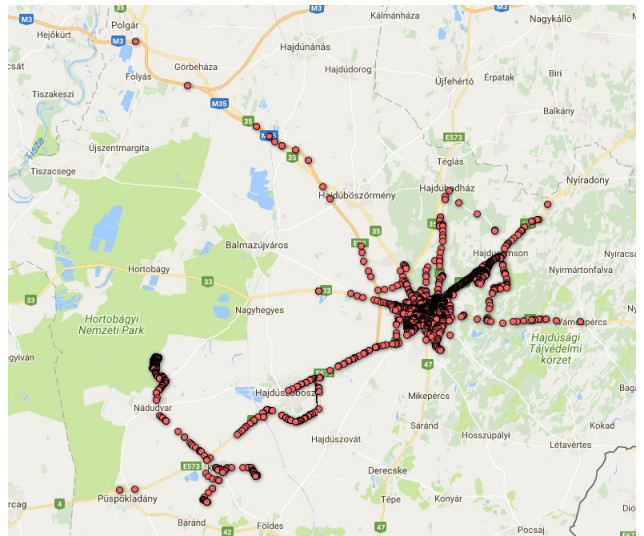
**zCar** is a LoRa based GPS tracking device with a long range outside LoRa antenna, optimized for tracking vehicles. It is powered by a cigarette lighter-DC connector adapter (12..24V DC).

## Operation of zCar

The accelerometer chip is able to detect if the unit moves. If no movement is detected, the tracker sends keepalive packets to the gateway every 60 minutes by default (this period can be set from 5 minutes to 1 day). When movement is detected, the tracker activates itself start the GPS. If the GPS is able to locate the device the coordinates will be reported to the LoRaWAN network. If the GPS receives no coordinates within a specified time, then the module will only send a short message that motion happened. All of the messages contains the battery level and temperature. The device can be turned off via downlink messages or by the zTrack setup application for Windows.

This device can show the real long range of the LoRaWAN system. We tested this device for more than a year around Debrecen. If the device has magnetic base external antenna then a well installed gateway can receive ABP SF12 messages from more than 40km in the suburb.

The OBDII version of the device is under development.



## SPECIFICATIONS

Frequency Band	867,1 – 868,8MHz ISM (SKU-EU) 902.000 MHz to 928.000 MHz (US)	Number of Channels	Configurable 8 channels (SKU-EU)
Battery Specs	Rechargeable via uUSB 3.7V 250 mAh LiPo	Transmit Power	+14 dBm (25 mW) (EU) up to +18.5 dBm high efficiency PA (US)
Receive Sensitivity	-141 dBm (EU) -146 dBm (US)	Antenna	Built-in or external
Operating Temperature	-10°C ~ 50°	LED indicator	Configurable (Activity, Charging)

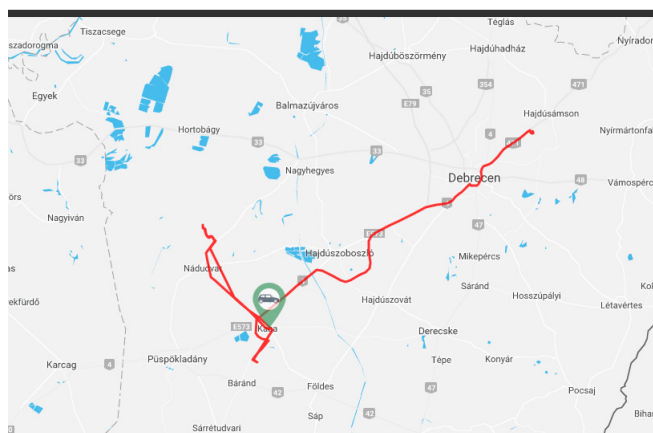
zCar is a product of ZANE systems Kft.

# zTrackMap application

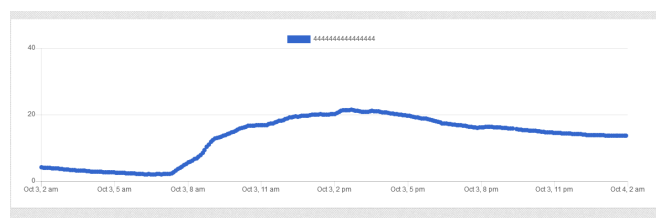
We made an application to acquire the messages from devices. This application is available on [app.ztrackmap.com](http://app.ztrackmap.com)

The aim of our application is to make possible the testing of the trackers. The system can get data from various sources:

- decoded data from network servers by websocket connection
- decoded data from network servers by HTTP PUSH connection (will be available from v4.0)
- encoded data from gateways by socket connection (if you manage your gateway)



Tracking trail



Temperature diagram

The API for trackers and other devices is available for our clients. Our devices are network provider independent devices. We make efforts to work out more connection channels to let our clients use their devices. If you have own gateway you can set up the server address to ours, so you can reach your devices through our application.

To set up your system in order to send data into our application please contact us at [sales@zane.hu](mailto:sales@zane.hu) for server setup parameters and details.

The application is also available on IOs and Android devices. You can download the app from Appstore and Google Play webshops. The application is free of charge for POC applications. For mobile application you can use the same settings and login details like on web application.

EUI	Date	SF	RSST	SNR	Port	FCNT	GN	EUI	Payload
0006110070921002	2017-10-04 08:34:37	SF12	-120	-16.80	207	3	72-76-FF-00-39-03-01-68	017155	
0006110070921002	2017-10-04 08:34:37	SF12	-91	4.00	207	3	88-27-EB-FF-FE-90-BA-0A	017155	
0006110070921002	2017-10-04 08:34:05	SF12	-93	3.00	204	2	88-27-EB-FF-FE-90-BA-0A	43a1900f5564007771017153	
0006110070921002	2017-10-04 08:34:05	SF12	-121	-19.50	204	2	72-76-FF-00-39-03-01-68	43a1900f5564007771017153	
0006110070921002	2017-10-04 08:33:28	SF12	-90	3.00	200	1	88-27-EB-FF-FE-90-BA-0A	490cfe50f808f551f3d59fa1c40dc106ds	
0006110070921002	2017-10-04 08:32:30	SF12	-103	3.50	207	46	88-27-EB-FF-FE-90-BA-0A	016254	
0006110070921002	2017-10-04 08:31:58	SF12	-93	1.50	204	45	88-27-EB-FF-FE-90-BA-0A	43a1970f5566007470016053	
0006110070921002	2017-10-04 08:27:46	SF12	-119	-13.00	204	41	72-76-FF-00-39-03-01-68	43905a0f608b086670055501	
0006110070921002	2017-10-04 07:08:00	SF12	-116	-10.20	207	37	72-76-FF-00-39-03-01-68	011554	
0006110070921002	2017-10-04 06:18:41	SF12	-116	-14.20	207	36	72-76-FF-00-39-03-01-68	011804	
0006110070921002	2017-10-04 05:29:22	SF12	-119	-5.20	207	35	72-76-FF-00-39-03-01-68	012354	
0006110070921002	2017-10-04 04:40:03	SF12	-123	-5.00	207	34	72-76-FF-00-39-03-01-68	012554	
0006110070921002	2017-10-04 03:50:46	SF12	-118	-9.20	207	33	00-72-76-FF-00-39-03-01-68	012054	
0006110070921002	2017-10-04 03:01:28	SF12	-119	-6.20	207	32	72-76-FF-00-39-03-01-68	013054	
0006110070921002	2017-10-04 01:22:54	SF12	-119	-13.20	207	30	72-76-FF-00-39-03-01-68	013654	

Incoming data

Authentication keys can be generated in the factory or by the user:

- you have to set up the given keys in your network and then you can see the payload in your own system. Or you can generate keys and send it to us, we can send the trackers with preloaded keys.
- you can generate, upload keys on your side using our service GUI for devices

# Other products

## Wirnet iFemtoCell

Wirnet iFemtoCell is a nano gateway designed for indoor applications.

They are in the core of the IoT (Internet of Things) network solution and enable a fast and secured data transmission between the connected object and the information system.

It allows to deploy and create a reliable and secured LoRa™ network for developing new innovative applications such as smart building, factory monitoring.

<http://www.kerlink.com/product/wirnet-ifemtocell/>



## Wirnet Station

The Wirnet Station range allows a robust and reliable LoRa™ network deployment.

They are in the core of the IoT (Internet of Things) network solution and enable a fast and secured data transmission between the connected object and the information system.

The Wirnet range of products is declined under several configuration to meet the need of each world area (APAC, Americas...)

Wirnet Station is a powerful, reliable and easy-to-integrate gateway dedicated to outdoor solutions. Thanks to a long range up to 15 kilometers, Wirnet Station allows a secured and robust connectivity between the sensor and the information system.

<http://www.kerlink.com/product/wirnet-station/>



+6dBi outdoor antenna

Various antennas and cables are also available on

<https://www.zane.hu/webshop/>



+3dBi outdoor antenna



[chipcad.hu](http://chipcad.hu)



[kerlink.com](http://kerlink.com)



LORIO T

[loriot.io](http://loriot.io)



[geowan.io](http://geowan.io)



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