

# Connected Ranger User Manual

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Connected Ranger is an industry grade geolocation device for both indoor and outdoor usage.

Ranger  
1.3

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# Using this manual

Thank you for choosing this Connected Inventions device. This device will provide you high-quality IoT with Connected Inventions' exceptional technology and high standards. This manual has been specially designed to guide you through the functions and features of your device.

## Read me first

- Before using your device, read the entire manual and all safety instructions to ensure safe and proper use.
- The descriptions in this manual are based on the default settings of your device.
- The images used in this manual may differ from the actual product.
- The contents of this manual may differ from software provided by service providers or carriers, and are subject to change without prior notice.
- Access the Connected Inventions website ([www.connectedinventions.com](http://www.connectedinventions.com)) for the latest version of the manual.
- Available features and additional services may vary by service provider.

- Applications on this device may perform differently from comparable applications and may not include all functions available (by ie. downlink messaging features)
- Connected Inventions is not liable for performance issues caused by third-party applications or improper installation.
- Please keep this manual for future reference.

## Malfunction

- In case of malfunction, deliver the device to the supplier. Do not open the cover.

## Transportation

- Do not remove packing material and do not repack the device unless necessary. Contact the shipping agent before transportation. Inside the device there is a battery which contains approximately 1.4 g of lithium.

## Disposal

- Return the device to a disposal station which collects electronics waste and batteries.

## Operation

- Protect the device from moisture, water, and dirt.

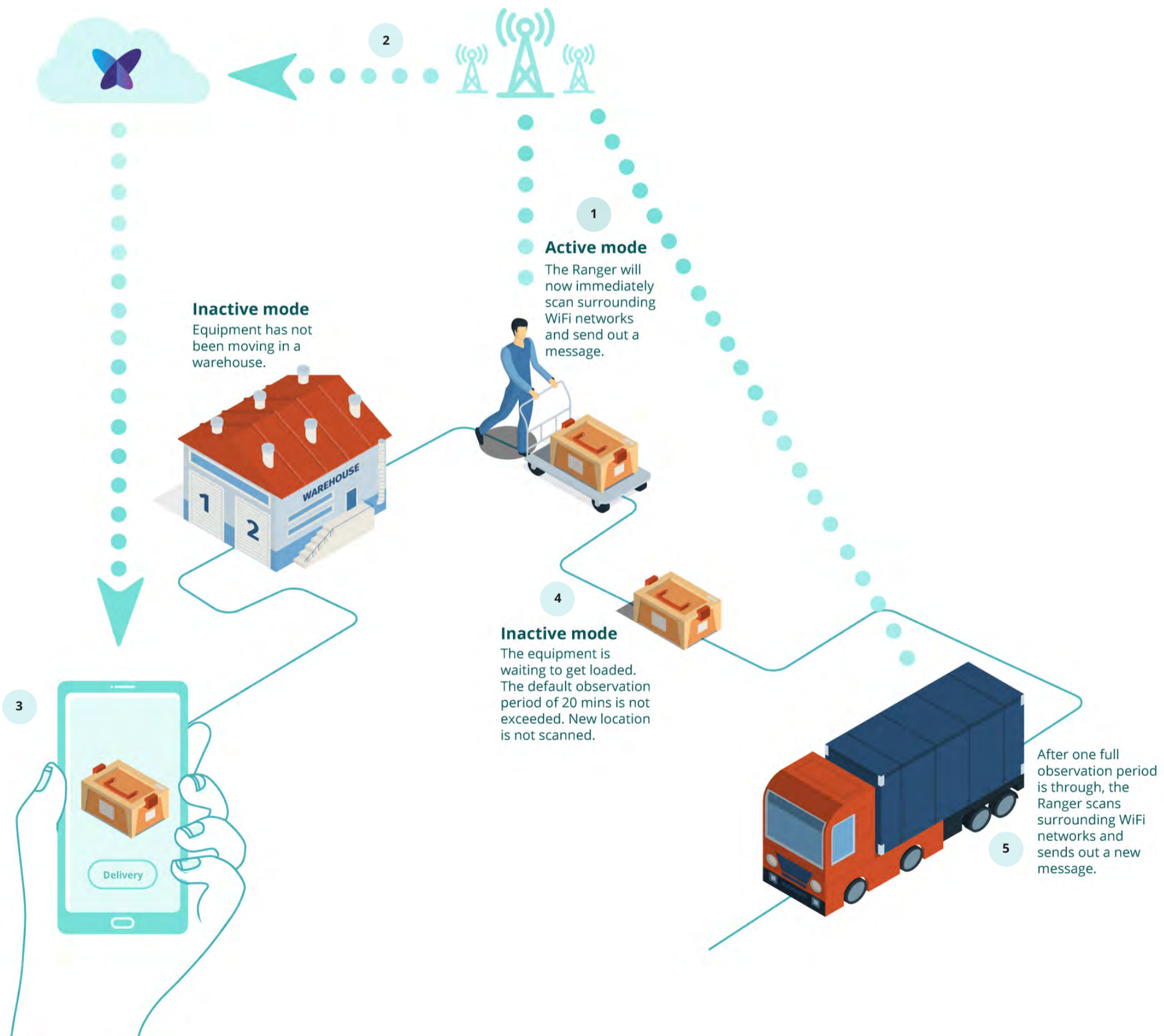
# About

Connected Inventions Ranger is an industry grade geolocation device for both indoor and outdoor usage. The device utilises ultra low power two way radio communications with Sigfox network technology. The device is battery powered and with normal usage will last up to five years. Ranger senses motion and in case motion was detected during last hour, it will scan the wifi- APN:s surrounding it and send the MAC-addresses, signal strengths and stationary time count via Sigfox network. This data can be refined to correspond physical geolocation for the device in backend platform services (ie. FoxerIoT).



# Function

- 1 Ranger detects motion.
- 2 Ranger scans WiFi and sends information to Sigfox network.
- 3 Location is received and observation is made.
- 4 When Ranger detects no movement, it enters the inactive mode.
- 5 After one full observation, Ranger will send new inactivity report.



# Function

## **Ranger detects motion**

- Ranger enters to Observation State

## **Ranger scans wifi networks and sends info to Sigfox network**

- Up to three best wifi MAC addresses and RSSI values are sent to Sigfox network.
- In case no wifi networks were detected, an empty message is sent to notify user the location could not be determined

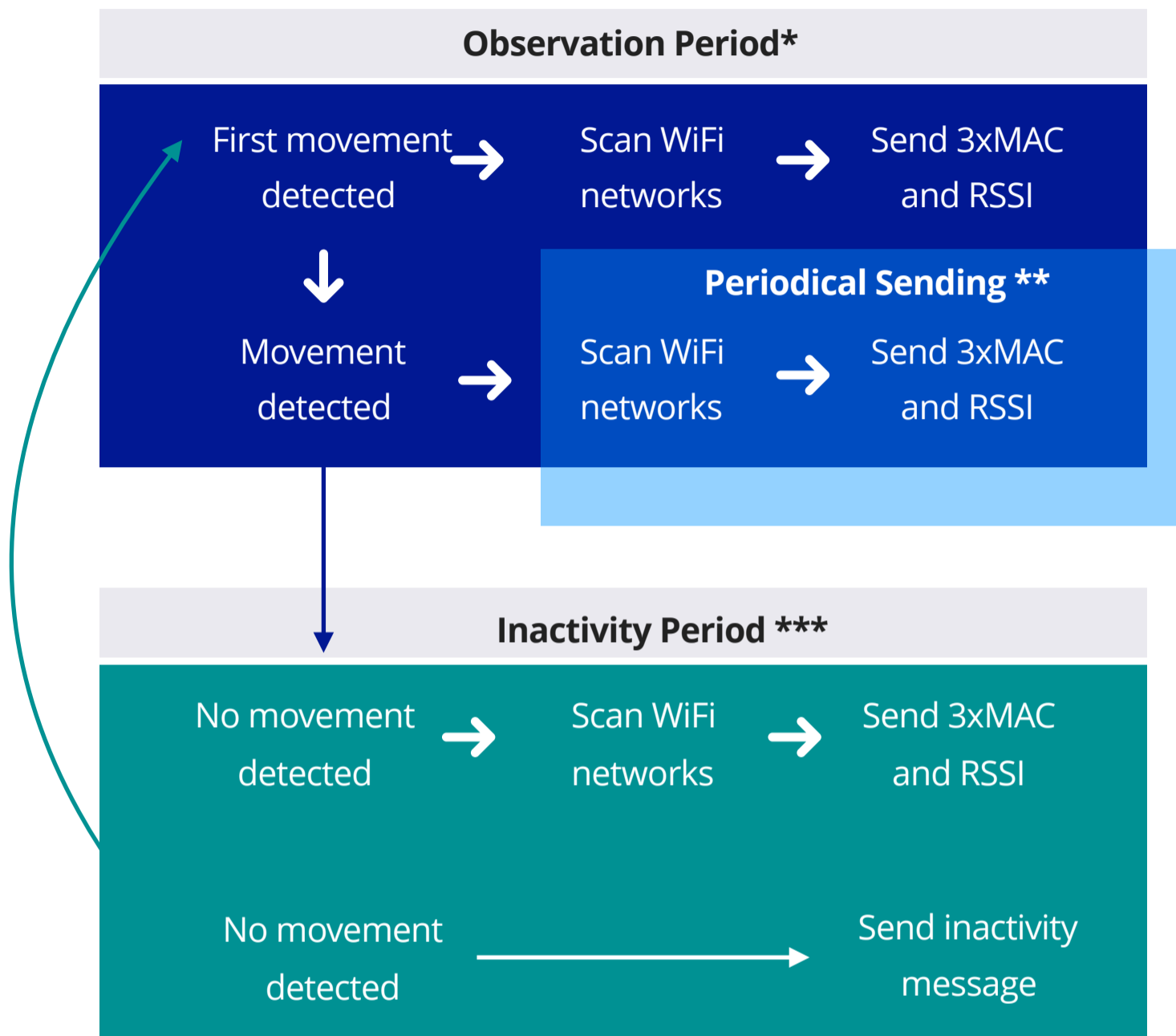
## **Sigfox cloud sends the data as callback to receiving data platform. IE. FoxerIoT**

## **Data platform will request geolocation service for location based on MAC addresses and RSSI:s**

## **Location is received and position observation made**

## **When Ranger detects movement has been stopped for Activity Period**

- Default setting 20min. User configurable via downlink message
- Ranger scans wifi networks and sends the info
- Ranger enters to Inactivity State
- Ranger starts to count hours of inactivity (value is included in the payload)
- After Inactivity period has been proceed without movement, Ranger will send new Inactivity Report



\* Default setting 20min

\* \* Sends updates during movement. User configurable from 10min to 12h. This feature is optional and set off by default.

\* \* \* Default setting 24h



# Assembly & Installation



Save the identifier and the key of the device. The identifier and the PAC key are on the label on the bottom of the device. You can also read the identifier and the PAC key using the QR code.

Slide the battery holder apart from the enclosure. Install 3.6V lithium batteries to the battery holder.



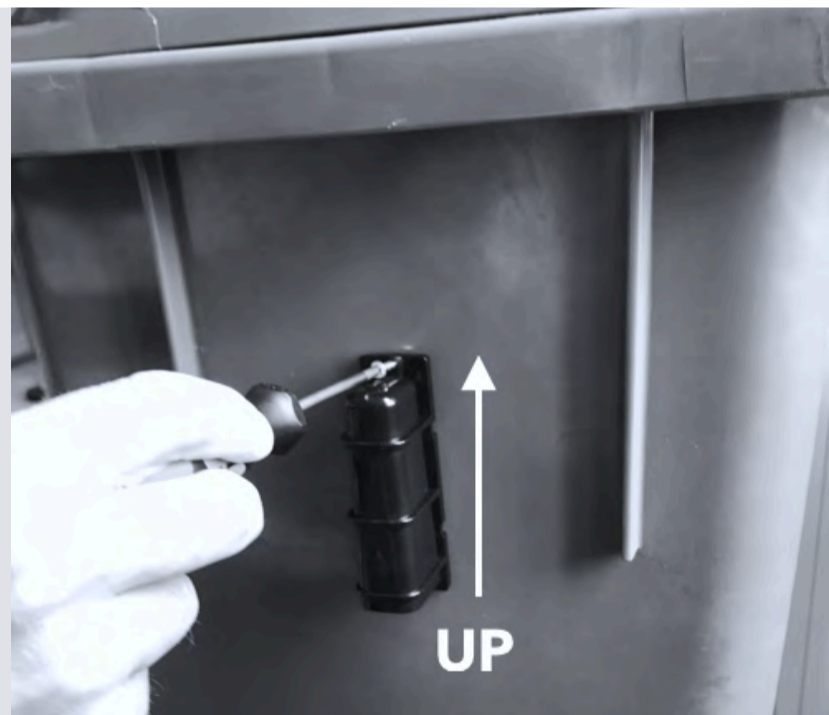
**!** Ensure the both batteries go same way. Please note the polarity! Putting batteries improperly, the device will be damaged and warranty will be void!



Slide the battery holder back to the enclosure and push it deeply enough for the holes in the holder and the casing to match each other.

Use a small PZ screwdriver to turn securing screw into place

Attach the device using screws or zip-ties so that the opening end is facing down to prevent water and dirt contaminating the sealing. This will also be optimal stance for radio performance and battery life.



- ! Please note! Avoid placing device closer than 15cm on any metal or magnetic object, electric cables, electric devices or selective glass as this will dramatically reduce radio performance as well as battery life of the device.

# Uplink: Payload Description

BYTE	BIT	TYPE	DESCRIPTION
0	0-3	UINT4	Device revision
0	4-5	UINT2	Cyclic context ID unique between 4 subsequent updates
0	6	UINT1	Update countains 0=one message, 1=two messages
0	7	UINT1	MSG1 packet id is always 0
1	8-15	UINT8	RSSI of the best WiFi station (A)
2-7	16-63	UINT48	MAC address of the best WiFi station (A)
8	64	UINT1	Stationary count is reported as 0=hours or 1=days
8	65-71	UINT7	How many hours or days the device have been stationary
9-11	72-95	UINT24	First 3 bytes of MAC of the third best station (C) if found

BYTE	BIT	TYPE	DESCRIPTION
0	0-3	UINT4	Device revision
0	4-5	UINT2	Cyclic context ID unique between 4 subsequent updates
0	6	UINT1	Update countains 0=one message, 1=two messages
0	7	UINT1	MSG2 packet id is always 1
1	8-15	UINT8	RSSI of the second best WiFi station (B)
2-7	16-63	UINT48	MAC address of the second best WiFi station (B)
8	64-71	UINT8	RSSI of the third best WiFi station ( C) if found
9-11	72-95	UINT24	Last 3 bytes of MAC of the third best station (C) if found

# Downlink: Payload Description

The first byte of the total 8 bytes of the downlink payload is in use and the other bytes are ignored by the Ranger R1.3 device. The first byte = first 2 hexadecimal digits (each being 4 bits long) are configured as follows:

<b>D0</b>	<b>D1</b>	<b>D2 ... D15</b>
Observation time	Periodical reporting	Reserved, set to zero

## Configuration settings for D0 (Observation time)

<b>HEX</b>	<b>OBSERVATION TIME</b>
0	10 min
1	15 min
2	20 min (default)
3	30 min
4	45 min
5	1 h
6	1 h 30 min
7	2 h
8	2 h 30 min
9	3 h
A	4 h
B	5 h
C	6 h
D	8 h
E	10 h
F	12 h

## Configuration settings for D1 (Periodical reporting)

HEX	PERIODICAL ACTIVITY UPDATE	INACTIVITY UPDATE PERIOD
0	OFF	1 h
1	OFF	2 h
2	OFF	3 h
3	OFF	4 h
4	OFF	6 h
5	OFF	9 h
6	OFF	12 h
7	OFF	24 h (default)
8	ON	1 h
9	ON	2 h
A	ON	3 h
B	ON	4 h
C	ON	6 h
D	ON	9 h
E	ON	12 h
F	ON	24 h

### Example

- Downlink message: 1800000000000000
- Observation time: 15 minutes
- Periodical activity update: ON
- Inactivity update period: 1 hour

# Troubleshooting

- Ensure the power is switched on
- Check there is Sigfox network coverage available
- Ensure the device is not installed near metallic objects, electric cables, electric devices or selective windows.
- Metallic roofs, steel reinforced concrete, underground location and other obstacles can dramatically reduce radio signal.
- Check the operation mode of the device.
- Incorrect downlink configuration will affect the behaviour of the product.
- Ensure the configuration is properly done.

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# Technical Specification

<b>Description</b>	Ranger R1.3 is a geolocation device for asset tracking
<b>Size</b>	30x110x40 mm including the wall mount
<b>Weight</b>	86 g including batteries
<b>IP rating</b>	IP68
<b>Batteries</b>	2 x AA 3.6V
<b>Battery capacity</b>	5,400 mAh
<b>Battery life</b>	5 years when the device sends approximately 4 messages a day
<b>Sensors</b>	Wifi, Accelerometer
<b>Environment</b>	Temperature -40 ... 50 °C Humidity 0 ... 95 %
<b>Radio configurations</b>	Sigfox 868 MHz (RCZ1), 902 MHz (RCZ2), 920 MHz (RCZ4)
<b>Antenna</b>	Internal helical antenna
<b>Communication</b>	Uplink & Downlink
<b>Certification</b>	FCC, CE, Sigfox Class 0U P_010A_40DB_01 (RCZ1) P_010A_FD1D_01 (RCZ2) P_010A_F73F_01 (RCZ4)
<b>Product Code</b>	CIRNG-3010-R0103 (RCZ1) CIRNG-3210-R0103 (RCZ2) CIRNG-3410-R0103 (RCZ4)

