

FIELD TEST DEVICE

sigfox RC4

User Guide
Version V1.0.1



Préambule / Preamble / Präambel / Preambolo / Preámbulo

- Ce guide décrit les fonctionnalités du produit adeunis®. Il explique les modes de fonctionnement du produit et la manière de le configurer.
- This guide describes the functionalities of the product adeunis®. It explains its functionnements and how to configure it.
- Dieser Leitfaden beschreibt die Funktionalität des Produktes adeunis®. Er erklärt die Betriebsfunktionen des Produktes und die Art und Weise, um es zu konfigurieren.
- Questa guida descrive la funzionalità del prodotto adeunis®. Questo spiega come funziona il prodotto e come configurarlo.
- Esta guía describe las funcionalidades del producto adeunis®. En él se explica los modos de funcionamiento del producto y cómo configurarlo.

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Declaration of conformity - Australia

Manufacturer's name : **adeunis.**

Manufacturer's address : **Parc Technologique PRE ROUX**
283 rue Louis NEEL
38920 CROLLES

Country: **FRANCE**

EN Authorised representative in Australia **M2M Connectivity Pty Ltd** 

Address : **E3763**
1 Barrett Street
3031 Kensington (Victoria)

Country: **AUSTRALIA**

Certify and declare under our sole responsibility that the following apparatus:

Description: **Field Test Device Wireless transceiver in 915-928MHz band.**

Manufacturer: **adeunis**

Identification: ARF8122B

Conforms with the essential requirements for Australia market:

Harmonized Standards :

- IEC 60950-1 ed.2 and IEC 62368-1(safety)
- AS/NZS 4268:2012

Name and position of person binding the manufacturer **Emmanuel MONNET**

or his authorized representative: **Certification Manager- adeunis**



Declaration of conformity - New Zealand

Manufacturer's name : **adeunis.**
Manufacturer's address : **Parc Technologique PRE ROUX
283 rue Louis NEEL
38920 CROLLES**
Country: **FRANCE**

Authorized representative  **Direct Control Limited
E3441**
Address : **Wellesley Street,
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Country: **NEW ZEALAND**

Authorized representative  **Go Wireless NZ Ltd
E678**
Address : **1 Kingsford Smith Drive
Unit 5, 7440 Rangiora (North Canterbury)**
Country: **NEW ZEALAND**

Certify and declare under our sole responsibility that the following apparatus:

Description: **Field Test Device Wireless transceiver in 915-928MHz band.**

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INFORMATIONS

Document Information	
Title	FIELD TEST DEVICE
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This document applies to the following products:

Name	Reference	Firmware Version
FIELD TEST DEVICE - sigfox RC4	ARF8122B	Version RTU: V01.04.00 Version APP: V01.01.02

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Our website contains a lot of useful information: information on modules and wireless modems, user guides, and configuration software and technical documents which can be accessed 24 hours a day.

E-mail

If you have technical problems or cannot find the required information in the provided documents, contact our Technical Support on our website, section « Technical Support ». This ensures that your request will be processed as soon as possible.

Helpful Information when Contacting Technical Support

When contacting Technical Support, please have the following information ready:

- Product type
- Firmware version (for example V1.0)
- A clear description of your question or the problem
- A short description of the application

INTRODUCTION

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ENVIRONMENTAL RECOMMENDATIONS

All superfluous packaging materials have been eliminated. We have done everything possible to make it easy to separate the packaging into three types of materials: cardboard (box), expanded polystyrene (filler material) and polyethylene (packets, foam protective sheets). Your device is composed of materials that can be recycled and reused if it is dismantled by a specialist company. Please observe local regulations concerning the manner in which waste packaging material, used batteries and your obsolete equipment are disposed of.

WARNINGS

Valid for products indicated in the declaration of conformity



Read the instructions in the manual.



The safety of this product is only guaranteed when it is used in accordance with its purpose. Maintenance should only be carried out by qualified persons.



Risk of explosion if the battery is removed with an incorrect type. Contact Adeunis for more information if needed.

Please note: Do not install the equipment close to a heat source or in damp conditions.

Please note: When the equipment is open, do not carry out any operations other than the ones set out in this document.



Please note: Do not open the product as there is a risk of electrical shock.



Please note: For your own safety, you must ensure that the equipment is switched off before carrying out any work on it.



Please note: For your own safety, the power supply circuit must be SELV (Safety Extra Low Voltage) and must be from limited power sources.

— — — This symbol on the devode or its packaging means the use of a DC voltage.

The product must be equipped with a switching mechanism so that the power can be cut. This must be close to the equipment. Any electrical connection of the product must be equipped with a protection device against voltage spikes and short-circuits.

Please note: the equipment is not intended for the use by a child.

Please note: When the aerial is installed outside, it is essential to connect the cable screen to the building's earth. We recommend using lightning protection. The protection kit chosen must permit the coaxial cable to be earthed (eg: coaxial lightning arrester with earthing of the cable at different places on the aerial at the base of pylons and at the entrance, or just before entering the premises).

RECOMMENDATIONS REGARDING USE

- Before using the system, check that the power supply voltage shown in the user manual corresponds to your supply. If it doesn't, please consult your supplier.
- Place the device against a flat, firm and stable surface.
- The device must be installed in a location that is sufficiently ventilated so that there is no risk of internal heating and it must not be covered with objects such as newspapers, cloths, curtains, etc.
- The device's aerial must be free and at least 10 cm away from any conducting material.
- The device must never be exposed to heat sources such as heating equipment.
- Do not place the device close to objects with naked flames such as lit candles, blowtorches, etc.
- The device must not be exposed to harsh chemical agents or solvents likely to damage the plastic or corrode the metal parts.

DISPOSAL OF WASTE BY USERS IN PRIVATE HOUSEHOLDS WITHIN THE EUROPEAN UNION



This symbol on the product or on its packaging indicates that this product must not be disposed of with your other household waste. Instead, it is your responsibility to dispose of your waste by taking it to a collection point designated for the recycling of electrical and electronic appliances. Separate collection and recycling of your waste at the time of disposal will contribute to conserving natural resources and guarantee recycling that respects the environment and human health. For further information concerning your nearest recycling centre, please contact your nearest local authority/town hall offices, your household waste collection company or the shop where you bought the product



After use, the batteries must be disposed of at an appropriate recycling centre. They must not be thrown away to degrade in the environment. When batteries are replaced, the device must be correctly implemented.



Warning for Switzerland : the annex 4.10 of SR 814.013 Standard must be applied for batteries.

1. INTRODUCING THE DEVICE

1.1. Description

The Field Test Device (FTD) from adeunis® is a Class 0 sigfox compatible device. This is not a point to point device and may not be used in this manner. This indicates that it must be used on sigfox operate network.

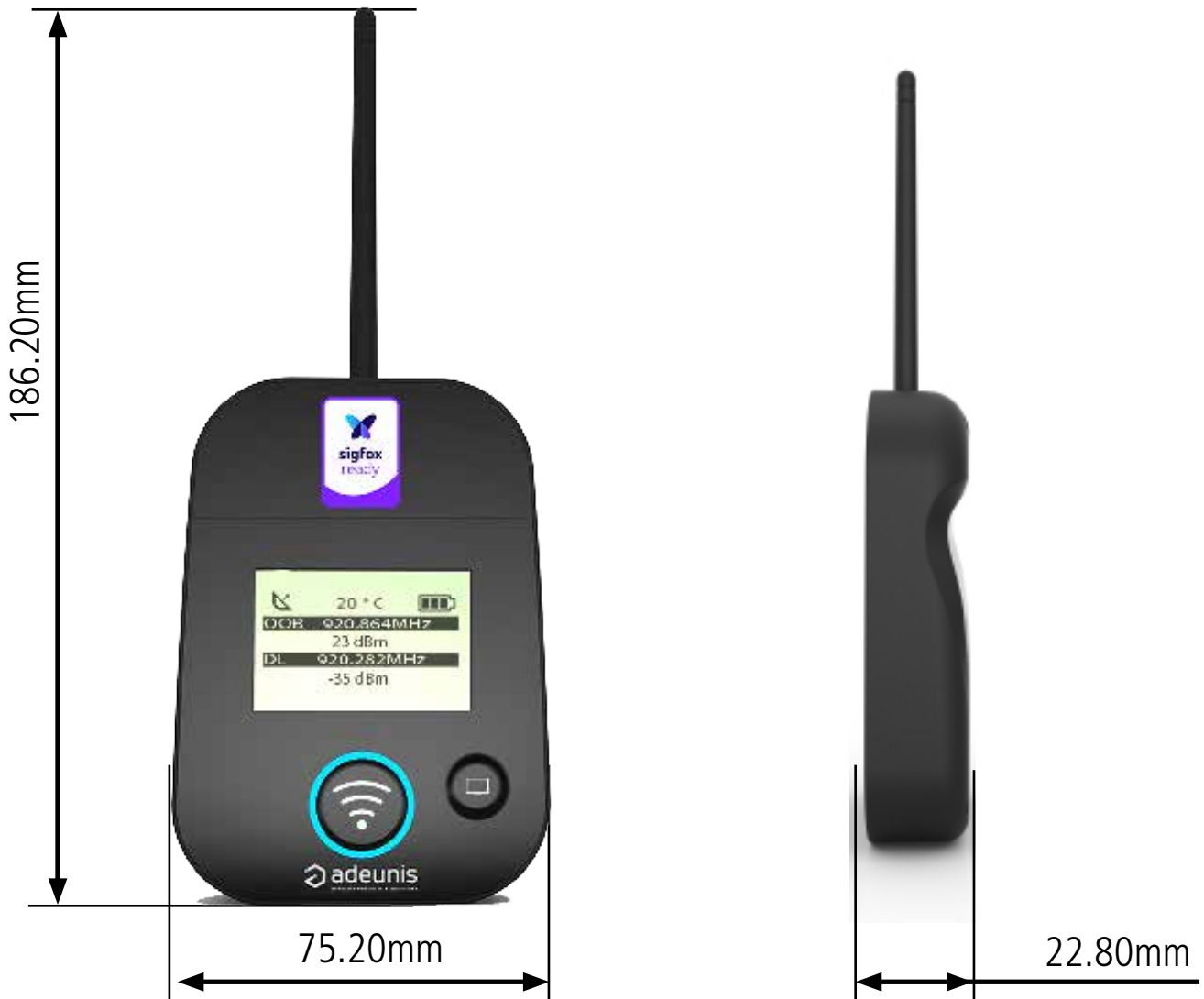
The sigfox Field Test Device from adeunis® is a ready-to-use device, which makes it possible to communicate with all network using the sigfox protocol. The system makes it possible to transmit and receive radio frames and to instantly view the results. Equipped with a large LCD screen, you can view various information relating to how the network being used is functioning (Uplink, Downlink, PER, etc.) in addition to information from sensors (GPS coordinates, temperature, battery level, etc.). This device is specifically adapted for application validation, such as communicating sensors, tracking, smart building, metering, security and M2M.

Thanks to its rechargeable battery, the FTD allows several hours of functioning and can be recharged using a standard mobile phone micro-usb.

1.2. Mechanical features

Unit specifications

Dimensions	H186.20 x L75.20 x P22.80
Weight	140g
Materials	Unit: ABS GP22 + Black Coloring (HB à 1.6mm) Lexan: Autotex Polycarbonate Antenna: Thermolast K TC7AA (d) (a) UL#E214855



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1.3. Technical specifications

Radio	
Communication	sigfox protocol and DBPSK sigfox
Network area	RC4
Supply	
Connector	Micro-USB - 5V - 500mA
Battery	Lithium-Ion Polymer 3.7V 2Ah 7.4Wh
Operational	
Device configuration	Via the IoT Configurator or AT commands
Serial rate	115.2 kbps
Parity	None
Amount of data	8
Stop bit	1
Functioning temperature	-20°C/+40°C in discharge and -20°C/ +36°C in charge

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1.4. Charging the FTD

The device is equipped with a rechargeable battery. Once the device has been connected to a USB charger or the USB socket of a computer, it will start to charge automatically; even if the ON/OFF communicator is set to OFF (this functions in exactly the same way as a mobile phone). The device can be used while it is charging. During charging, the charge indicator will be red. When the device is fully charged, the indicator will turn green.



Figure 1 : Device charging



Figure 2 : Device is fully charged

If the battery is completely empty, it will be necessary to recharge the device for 6 hours in order for it to be fully charged.

2. DEVICE DESCRIPTION

2.1. User interface

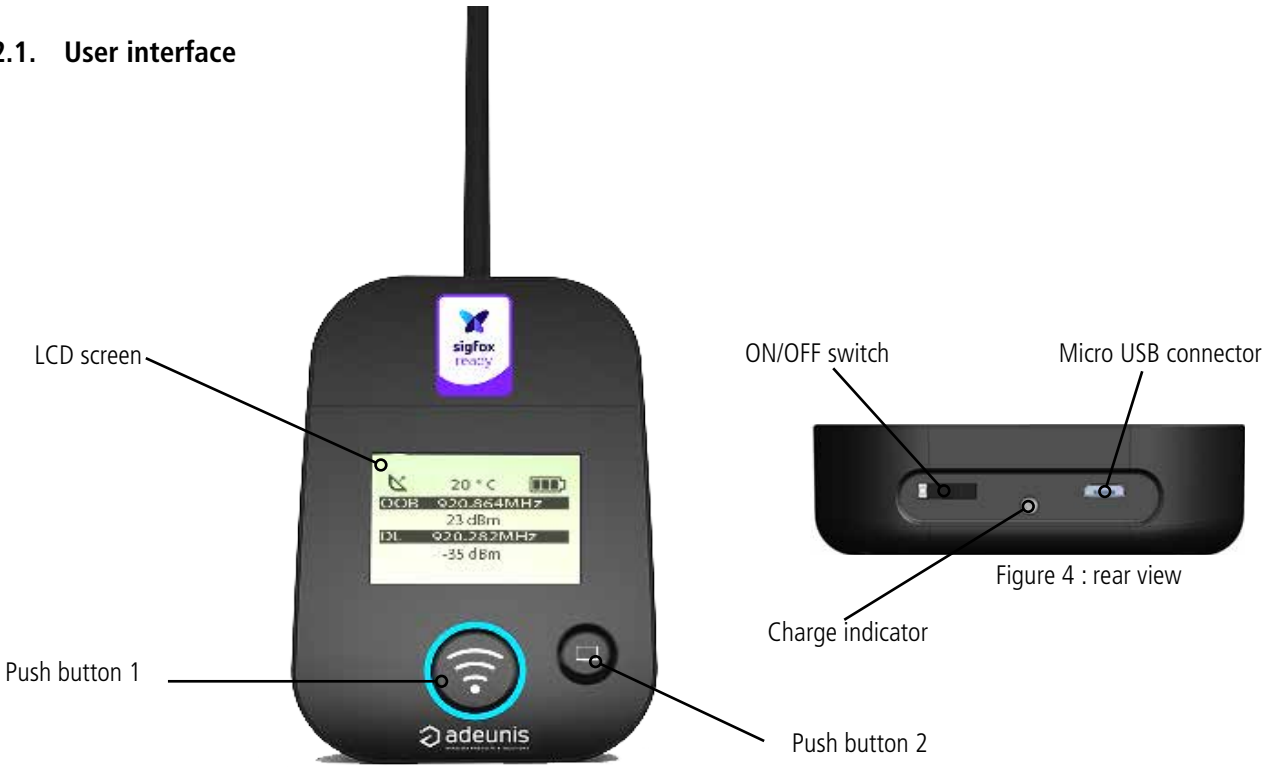


Figure 3 : Front view

2.2. Button description

Interface operation	
	<p>Push button 1</p> <p>This button allows you to carry out radio transmissions in manual mode. In the PER menu, a long press will allow you to reset the counters to zero.</p>
	<p>Push button 2</p> <p>This button allows you to manage the LCD screen. When the LCD backlight is switched off, pressing this button will switch on the backlight. When the LCD backlight is switched on, each press will allow you to scroll through the different screens available on this device.</p>
	<p>ON/OFF Switch</p> <p>The ON/OFF switch allows you to switch the device on or off. Moving the switch to the right will turn the device on.</p>
	<p>Micro-USB connector</p> <p>The micro-USB connector allows you to charge the device (see paragraph 1.4) or configure it (see paragraph 3).</p>
	<p>Charge indicator</p> <p>The charge LED shows you the device's charge status (see paragraph 1.4).</p>

2.3. Sensors description

The product also has two on board sensors: a temperature sensor and an accelerometer. This one allows the transmission of an OOB frame (SIGFOX frame) when a large vibration is detected (by shaking the device for example).

3. SCREEN DESCRIPTION

The LCD screen of the product is split on few part :

- The START screen (Showing the firmware version) - Only on the powering up
- The SIGFOX CYCLE screen
- The GPS screen
- The PER screen (Packet Error Rate)
- The DOWNLINK FRAME screen

The following icon are present on each screen of the product

Item	Icon	Description
GPS status (First on the left)	No icon	GPS has been deactivated
		GPS has not been synchronized
		GPS has been synchronized
Temperature (Third on the left)	20 °C	Temperature in °C
Battery (Last on the left)		Battery level
		Product in charge

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3.1. Start Screen

The device is switched on using the ON/OFF switch located on the underside of the device. Once it has been switched on, the device’s LCD screen will light up and the start menu will be displayed. This screen show the 2 firmware versions during few seconds.

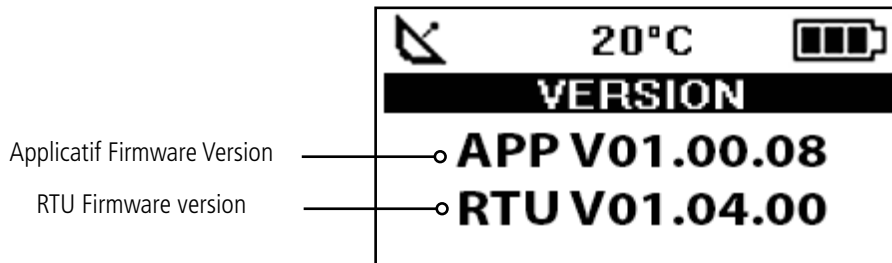


Figure 5 : Firmware version

NOTE : If the device does not switch on, this could mean that there is insufficient battery charge. You would then need to connect the device to a USB charger. When the battery is completely empty, it is possible that the device will not switch on, even when connected. Please wait a few minutes before the device can be used.

3.2. Cycle screen sigfox

This screen is displayed after the start screen.

All the frame transmit or receive on the network can be see on the screen. If the product is correctly set, frames are directly sending on the sigfox network as soon as the product is power on. The periodic transmission icon and 3 sending frames sigfox cycle information (UL1 to UL3) must appear, join the emission frequency.

Uplink and Downlink transmission information will be displayed on the LCD screen.

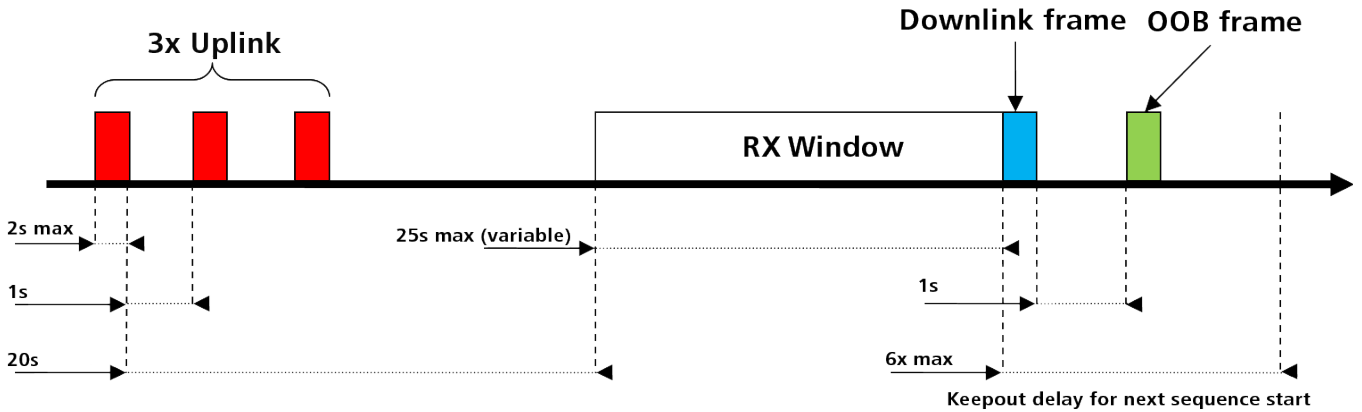
The first line show the Uplink information «ULx» with x for the number and frequency of repetition. She also show the Out Of Band «OOB» information. The second line show the power used

The third line show the Downlink information «DL» and frequency of the reception window

The last line show the RSSI received

The sigfox cycle can be split in several stages :

- 3 emissions on a variable frequency (Figure 6, 7 et 8)
- 1 reception windows after a 20 seconds times break (Figure 9)
- 1 OOB emission, if the product received a downlink (Figure 10)



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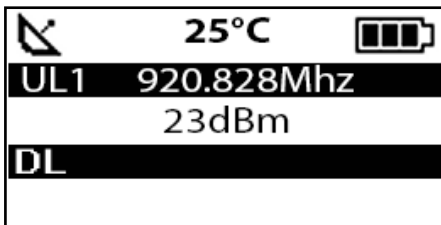


Figure 6 : Uplink 1

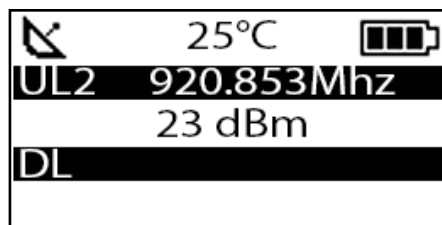


Figure 7 : Uplink 2

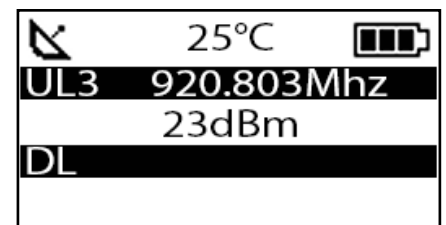


Figure 8 : Uplink 3

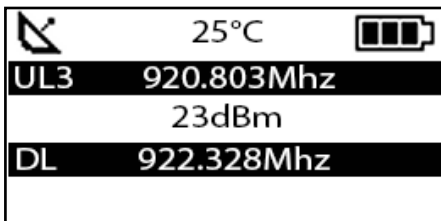


Figure 9 : Downlink

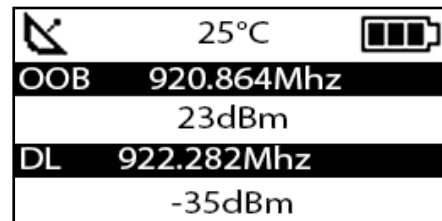


Figure 10 : OOB

Item	Icon	Description
Transmission Status (Second on the left)	No icon	There is currently no radio transmission
		Manual transmission has been triggered (transmission cycle in progress)
		Periodic transmission has been triggered (transmission cycle in progress)
Uplink information (Black Line)		Display showing the number of Uplink (UL1 to UL3) frame repetitions as well as the transmission frequency of the frame or the OOB frame, accurate to three decimal place.
Uplink Information (White Line)		Display showing the SF used as well as the transmission power of the frame.
Downlink Information (Black Line)		Display showing the listening window of the device (DL) as well as the reception frequency of the frame, accurate to three decimal place.
Downlink Information (White Line)		Display showing the RSSI of the most recent frame received.

The Downlink information displayed on the device relates to a Downlink frame sent from a sigfox network. If no information can be found in this section, this does not indicate that the device will not function on the network but only that it has not received any information from the network. To validate the upload link (sending a frame from the device to the network) it is necessary to use an interface that will allow you to read frames from the network (example: back-end or application).

3.3. GPS screen

This screen can be accessed by briefly pressing on pushbutton 2 after the home screen. It will allow you to view the functioning information of the GPS module, as well as the device's GPS positioning.

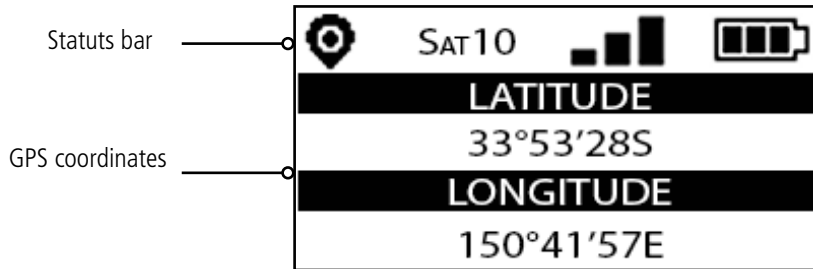


Figure 11 : GPS screen

Item	Icon	Description
Number of Satellites (Second on the left)	SAT xx	Indicates the number of satellites received by the device
GPS signal (Third on the left)		Indicator showing the quality of the GPS signal 1 bar: weak reception 2 bars: average reception 3 bars: good reception
LATITUDE		Display showing latitude coordinates in degrees, minutes and seconds
LONGITUDE		Display showing longitude coordinates in degrees, minutes and seconds

When GPS has not yet been "fixed", no information on latitude or longitude will be displayed on the screen and the information icon will indicate that GPS has not been synchronized.



Figure 12 : GPS screen (No synchronisation)

If the device falls out of synchronization with GPS, the information on this screen will no longer be available. There will be no memory of the last received position.

3.4. PER (Packet Error Rate) screen

This menu can be accessed by briefly pressing on pushbutton 2 after the GPS menu. It will allow you to evaluate the quality of the radio connection between the device and the network.

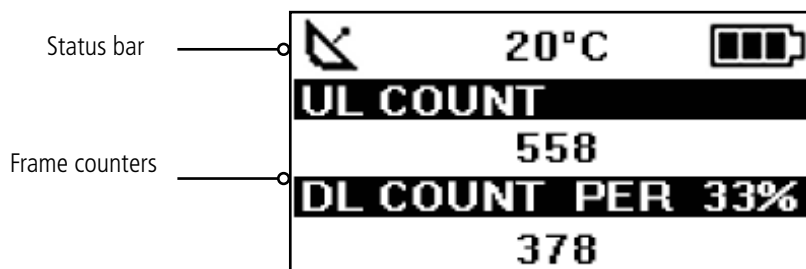


Figure 13 : PER screen

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The screen will display:

- The number of frames sent (UL COUNT), including repetitions
- The number of frames received (DL COUNT)
- The Packet Error Rate (PER) as a percentage

The PER measurement is calculated by comparing the number of frames transmitted to the number of frames received:

- $PER (\%) = 100 - (DL_COUNT/UL_COUNT) * 100$

IMPORTANT : in this menu, a long press will allow you to reset the counters to zero.

3.5. Downlink screen

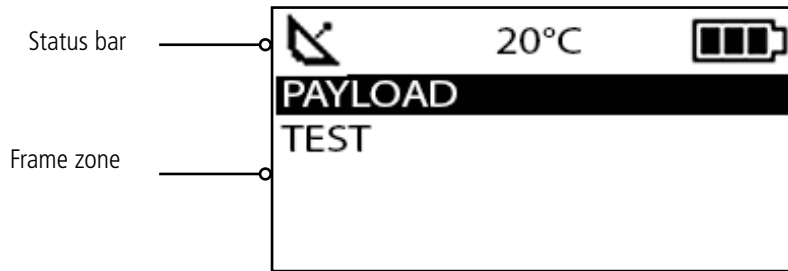


Figure 14 : Downlink screen

This menu can be accessed by briefly pressing on pushbutton 2 after the PER menu. It will allow you to view a downlink frame sending by the network. This frame is displayed in ASCII characters. The non printable characters are replace by a point.

The screen allow a viewing of 51 characters (17 characters per lines). If the size of the payload is upper than 51 bytes, the product will not display the extra bytes.

4. DECODING THE PAYLOAD

The size of the Field Test Device’s payload can vary depending on the information transmitted. The first byte will enable you to identify the presence of information contained in the payload. Information will always be shown in the order indicated in the following table.

The frame is transmitted either periodically or on event following a press of the button. Depending on the communication mode (mono directional or bidirectional) defined by the S382 register, the interpretation of the end bytes of the frame is different:

Example of a payload received: 8C1B45159690005534502020

This example will be used in order to explain how the payload is decoded.

If S382=1, bidirectional mode :

Order	1	2	3	4	5	6
Number of bytes	1	1	4	4	1	1
Description	Status	Temperature	GPS Latitude	GPS Longitude	UL Counter	DL Counter
Example	8C	1B	45 15 96 90	00 55 34 50	20	20

If S382=0, mono directional mode :

Order	1	2	3	4	5
Number of bytes	1	1	4	4	2
Description	Status	Temperature	GPS Latitude	GPS Longitude	UL Counter
Example	8C	1B	45 15 96 90	00 55 34 50	20 20

4.1. Status

Hex	Decimal	N°order	Bit N°	Comments	Value
8C	1	1	7	Presence of temperature information	0 or 1
	0		6	Transmission triggered by the accelerometer	0 or 1
	0		5	Transmission triggered by pressing pushbutton 1	0 or 1
	0		4	Presence of GPS information	0 or 1
	1		3	Presence of Uplink frame counter	0 or 1
	1		2	Presence of Downlink frame counter	0 or 1
	0		1	Presence of battery level information	0 or 1
	0		0	No used	0

0: Data missing from the payload

1: Data present in the payload

4.2. Temperature

Hex	Binary	N°order	Number of bytes	Comments	Value
1B	0001 1011	2	1	Temperature in °C (Additional to 2)	-128 ... +127

Aid for decoding temperature

Hex	Sign Bit	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Value T°C
Value		64	32	16	8	4	2	1	
1B	0	0	0	1	1	0	1	1	+27°C
F4	1	1	1	1	0	1	0	0	-12°C

- For a positive temperature (sign bit = 0) : Value T°C = 16 + 8 + 2 + 1 = +27°C
- For a negative temperature (sign bit = 1) : Value T°C = (64+32+16+4)-128 = -12°C

4.3. Latitude

Hex	N°order	Bit N°	Comments	Value
45	3	7..4	BCD coding of the entire degree section (tenth of a degree)	45°15,9690
		3..0	BCD coding of the entire degree section (whole degrees)	45°15,9690
15		7..4	BCD coding of the entire minute section (tenth of a minute)	45°15,9690
		3..0	BCD coding of the entire minute section (whole minutes)	45°15,9690
96		7..4	BCD coding of the decimal section (tenth)	45°15,9690
		3..0	BCD coding of the decimal section (one hundredth)	45°15,9690
90		7..4	BCD coding of the decimal section (one thousandth)	45°15,9690
		3..1	Not used	
	0	Hemispheric coding	0 : North 1 : South	

Note: the value expressed in the payload will be in degrees, minutes and fractions of a second. A conversion to degrees, minutes and seconds must be carried out in order to make a comparison with the coordinates displayed on the device's LCD screen.

4.4. Longitude

Hex		N°order	Bit N°	Comments	Value
00		4	7..4	BCD coding of the entire degree section (one hundredth of a degree)	005°53,450
			3..0	BCD coding of the entire degree section (one tenth of a degree)	005°53,450
55			7..4	BCD coding of the entire degree section (whole degrees)	005°53,450
			3..0	BCD coding of the entire minute section (one tenth of a minute)	005°53,450
34			7..4	BCD coding of the entire minute section (whole minutes)	005°53,450
			3..0	BCD coding of the decimal section (tenth)	005°53,450
50			7..4	BCD coding of the decimal section (one hundredth)	005°53,450
			3..1	Not used	
			0	Hemispheric coding	0 : Est 1 : Ouest

Note: the value expressed in the payload will be in degrees, minutes and fractions of a second. A conversion to degrees, minutes and seconds must be carried out in order to make a comparison with the coordinates displayed on the device's LCD screen.

4.5. UL counter

If S382=1, bidirectional mode :

Hex	Decimal	N°order	Number of bytes	Comments	Value
20	32	5	1	Uplink frame counter	0 ... 255

If S382=0, mono directional mode :

Hex	Decimal	N°order	Number of bytes	Comments	Value
20	8224	5	2	Uplink frame counter	0 ... 65 535
20					

Please note: This counter is not the sigfox stack frame counter, but an internal frame counter. Therefore, there is no correlation between this counter and the one that you can view on the network.

4.6. DL counter

If S382=1, bidirectional mode :

Hex	Decimal	N°order	Number of bytes	Comments	Value
20	32	6	2	Downlink frame counter	0 ... 255

Please note: This counter is not the sigfox stack frame counter, but an internal frame counter. Therefore, there is no correlation between this counter and the one that you can view on the network.

If S382=0, mono directional mode : no information on UL counter (absent in the frame).

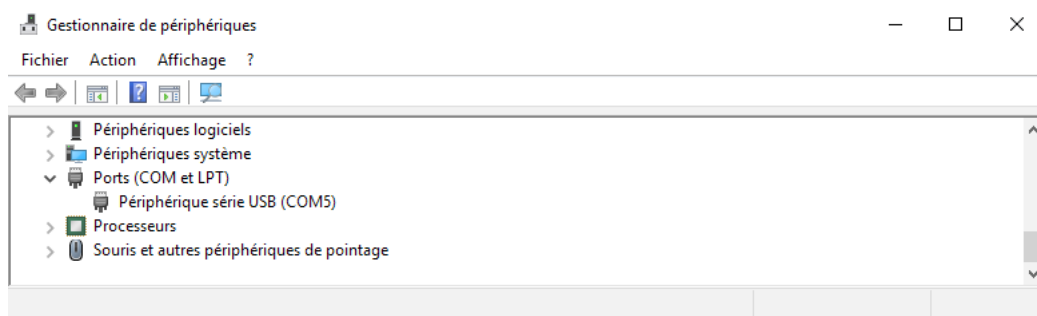
5. DEVICE CONFIGURATION

The device can be configured using the USB connector. This connection allows you to communicate with the device via the IoT Configurator and a virtual com port and to transmit AT commands in order to modify the parameters of the device.

5.1. Connecting the device to a computer

Connect the Field Test Device (FTD) to the USB input of a computer. The FTD device has a Type B micro USB connector. During connection, the device must be recognized by the computer as a Virtual Com Port (VCP) device.

Using Windows: Verification that the device has been recognized to be functioning properly can be obtained by consulting the device manager. You should see the USB series device with a corresponding COM port number appear during connection.



If you are not able to see a device of this type, you must install the USB driver for this device, available to download from our website: <https://www.adeunis.com/en/downloads/>

Select:

- Driver USB-STM32, if your computer is a 32 bits system

5.2. Command mode

Use a COM port terminal in order to communicate with the device. We use the HERCULES COM port soft terminal available to download for free by clicking on the following link: http://www.hw-group.com/devices/hercules/index_en.html

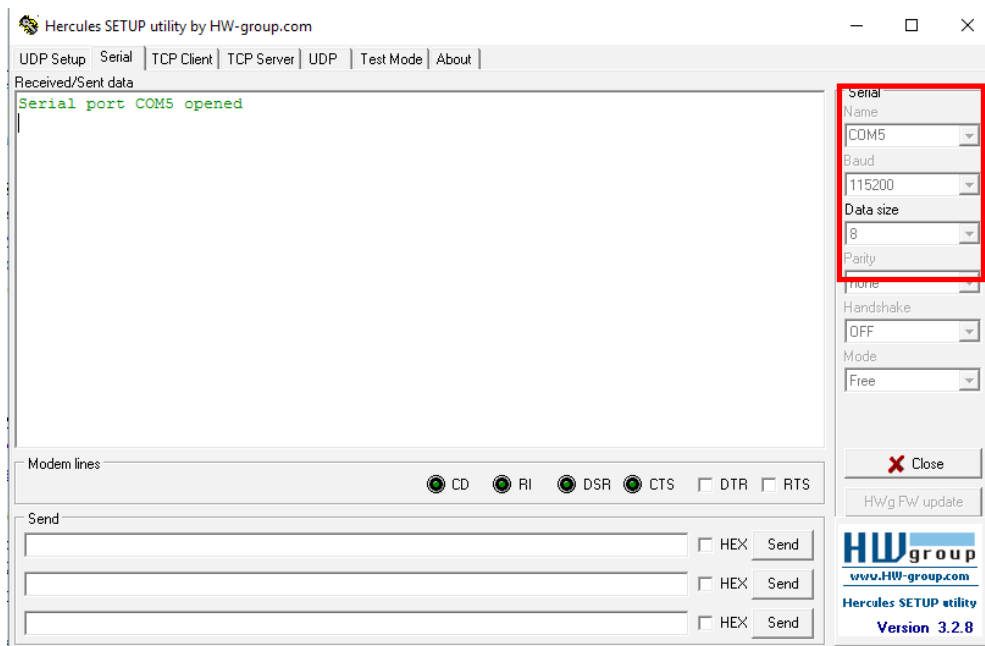
- With Hercules, select the "Serial" tab, then configure the serial port with the following serial parameters:

Parameters	Value
Rate	115 200 bps
Parity	None
Data	8
Stop Bit	1

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- Select the serial port on which the device has been created with Windows (Name).
- Click on the "Open" button to open the serial port.

PLEASE NOTE: If the com port has been opened correctly, Hercules will display the message "Serial COM3 port opened". Alternatively, "Serial port com opening error" will be displayed, meaning either that the com port is already open for another application, or it does not exist.



Switch ON/OFF

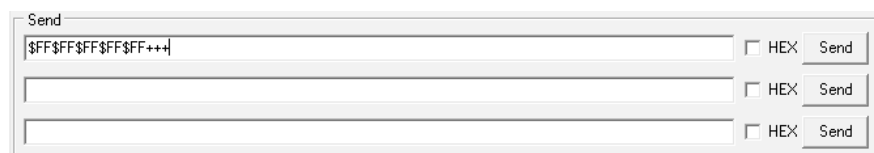


Bottom view

- To supply power to the device, move the switch to the right.

You must send a specific frame in order to move the device to configuration mode.

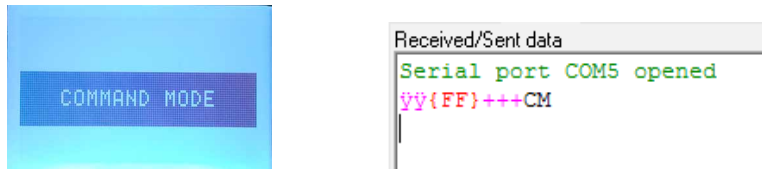
Frame expressed in hexadecimals: 0xFF 0xFF 0xFF 0xFF 0xFF 0x2B 0x2B 0x2B



For Hercules, this frame must be entered in one of the 3 lines available at the bottom. The hexadecimal format must be expressed using a "\$" in this program, which gives us the following frame: \$FF\$FF\$FF\$FF\$FF\$2B\$2B\$2B



- Send the transition frame in command mode in order to switch the device to configuration mode by clicking on the SEND button. After a few seconds, you should see the COMMAND MODE screen appear on the device’s LCD. This may take some time due to the fact that transition to command mode can only happen during a transmission cycle.



On the com port terminal, you should also have "CM" feedback for Command Mode. Sending a character on Hercules is displayed in magenta and receiving a character is displayed in black. If you do not see sending characters, this is probably because ECHO is not active on this program. To activate the option in the accessible menu, right click in the viewing window.



5.3. AT command

A command starts with 2 ASCII characters: "AT", followed by one or more characters and data (see the list below for the syntax of AT commands available on the modem).

Each command must finish with a "CR" or "CR" "LF" – both are acceptable. (CR indicates: Carriage Return, LF indicates: Line Feed)

- Once the command has been received, the modem will feedback:
- <cr><lf> "Data" for ATS type playback control <n> ?, AT/S or AT/V
 - "O" <cr><lf>, for any other command when this has been accepted.
 - "E" <cr><lf>, if it refuses the command due to a syntax error, unknown command, unknown range, invalid parameter, etc.
 - "CM" <cr><lf>, if it accepts the input in command mode

Table of AT commands:

Command	Description	Response
AT<n> ?	Feeds back the content of the n range	Sn=y where y represents the content of the n range
AT<n>=<m>	Transfers the m value to the n range	"O" if the operation has been accepted "E" if the operation has been refused "W" if the operation has encountered a problem during configuration
AT/S	Edits the content of all of the user ranges in the form of a list.	Sxxx=y for each range
AT/d	Displays all registers (user, network, production)	Sxxx=y for each range
AT/V	Feeds back the version of the software	Example: 8123AAA_PRG_1601_V01.00.00:8134AAA_PRG_1601_V01.00.00 (chapter 6)
AT&W	Saves the current configuration to non-volatile memory.	"O" if the operation has been accepted. "E" if the operation has been refused.
AT0	Exit command mode	"O" if the operation has been accepted. "E" if the operation has been refused.
ATT63 PROVIDER	Unblock the operating range	«O»<cr><lf>

Example of a set of commands and corresponding responses that can be seen on the terminal:

Command	Description	Response
\FFF\FFF\FFF+++	Input request in command mode	CM
ATS380=3600	Changing the frame transmission period	O
ATS380?	Return the value of the S380 register	S380=3600
AT&W	Memory request for the state range	O
ATO	Output request in command mode	O

Interpreting the previous example: the user modifies the frame transmission period. The register 380 is verified and the parameters are saved before exiting. When exiting command mode, the device will start a new transmission cycle.

5.4. Register description

Once supplied with power, the Field Test Device will function according to the last saved configuration (factory settings if this is the first time the device has been switched on, or if this configuration has not been changed).

ATS<n>=<m> or ATR type modification commands allow you to modify the content of these ranges.

It is essential to save the parameters using the AT&W command before exiting the command mode, otherwise all of your changes will be lost.

IMPORTANT: The registers that are not documented (that can appear in the list following the AT/S command) in the paragraphs that follow are reserved and must not be changed.

The below list of registers allows to change the behavior of the product.
Details on how each register works can be found after the table.

Range	Content	Default value	Comments
S341*	Accelerometer	2000	0 : deactivated 1-2000 : Sensibility range
S370	RESERVED	1	
S371	GPS configuration	11	0: GPS deactivated 1: GPS activated/Continuous Mode 0x0000101: GPS activated/Continuous Mode + GPS Reset (Cold Start)
S380	Frame transmission period	600	0: No periodic transmission 1 to 86400 (expressed in seconds) : Periodic transmission
S382	Communication mode	1	0: mono directional 1: bidirectional
S383	RESERVED	1	
S385	Personalized Payload Size	0	0 : Deactivated 1 to 12 : Size of the payload
S386	Personalize Payload Text - Bloc 1	0	Each bloc allow to define 4 bytes of the payload The data enter in the last bloc will be not take in charge
S387	Personalize Payload Text - Bloc 2	0	
S388	Personalize Payload Text - Bloc 3	0	
S389	Personalize Payload Text - Bloc 4	0	
S410*	sigfox identifier	--	sigfox identifier of the product Read-only
S421*	sigfox PAC (first part - MSB)	--	sigfox PAC (first part - MSB) Read-only
S422*	sigfox PAC (second part - LSB)	--	sigfox PAC (second part - LSB) Read-only

*These registers are accessible in the PROVIDER mode after executing the ATT63 PROVIDER command then AT/d.

S371 : GPS configuration

The way in which the GPS module is configured is completely independent from the main firmware. Two functioning modes are available:

- Permanent Mode
- Periodic Mode

In **permanent mode**, the GPS is always active and will operate at maximum power (like the GPS in a car). This is the most efficient mode and we would recommend using it when it is necessary to move the Field Test Device (example: if the device will be in a car), or if satellite visibility is poor.

In **periodic mode**, the GPS will start for a period of 5 mins at maximum power before switching to periodic power. In this mode, the GPS will become active for 30-40 seconds every 10 minutes. The rest of the time, it will be in rest mode, which will aid the device's independence. This mode should be used for static use (fixed position, or very slow movement), or where satellite visibility is very good.

The user can also choose to reset the GPS once it is switched on. This operation will allow you to delete the GPS memory as well as all previously acquired information. This can be useful when the GPS is not able to synchronize itself while it is starting up. Essentially, the GPS will use its internal memory to set a position and to locate satellites, but when the GPS has not been used for a long period of time or has traveled a great distance (for example, if it has traveled on-board an aircraft to another country), the information will be inaccurate and must be deleted.

If the GPS coordinates are available during transmission of a sigfox frame, these coordinates will be included in the payload. Otherwise the corresponding bytes will be deleted, rendering the payload shorter.

S382 : Communication Mode

The communication mode allows to modify the device comportment in front of the network.

- Mono directional mode: the device transmit a frame to the network and can't receive a downlink frame.
- Bidirectional mode: the device transmit a frame to the network and open a reception window which allows the network to transmit a frame to the device, but also to transmit acknowledgment frames.

S385 : Custom Payload

This option allows the product to issue a custom frame instead of the predefined payload of the product.

The user can configure the size of his payload and the text to send.

When the value of the register is 0, the function is inactive and the product uses the format of the standard payload.

When the value contains a value, the product sends the characters contained in registers S386 to S388.

The maximum size allowed for this payload is 12 bytes

S386 to S389 : Custom Payload

The 4 registers allow to configure a personal payload:

- The register S386 makes possible to define the bytes 1 to 4 of the frame
- The register S387 makes possible to define the bytes 5 to 8 of the frame
- The register S388 makes possible to define the bytes 9 to 12 of the frame
- The register S389 makes possible to define the bytes 13 to 16 of the frame

The values must be registered in hexadecimal code: exempt for the word «TEST» -> ATS386 = 54455654

ATTENTION: To send a single byte, you must complete the block with zeros. Otherwise, the product completes itself the missing blocks and you would not get the desired result. Example with ATS385 = 1:

- ATS386 = AB000000 -> The system includes the AB000000 frame and sends the first byte -> You will receive a good AB
- ATS386 = AB -> The system includes the 000000AB frame and sends the first byte -> Your will receive 00

6. DEVICE UPDATES

The device has 2 firmwares:

- RTU firmware
- APPLICATIVE firmware

It is possible to find out the references for versions loaded onto the device using the command AT/V or the IoT Configurator.

Example :

8122AAA_PRG_1601_**V01.01.02**:8119AAB_AAE_1801_**V01.04.00**

The RTU firmware version is: **V01.01.02**

The APPLICATIVE firmware version is: **V01.04.00**

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7. DOCUMENT HISTORY

Version	Content
V1.0.1	Creation of the document
V1.0.1	Various updates