α·INC TRIAXIAL INCLINOMETER SENSOR

UG-ENG-COMMONSENSE-IOT-PLATFORM

LoRaWAN™

DOCUMENT

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V1.0	03.06.2024	SA	First version of document
V1.1	15.06.2024	SA	SET/GET commands explained

Disclaimer

Contents

1   ACRONYMS AND ABBREVIATIONS

AES	Advanced Encryption Standard
AMRR	Alarm Monitoring Refresh Rate
CA	Critical Alarm
EUI	Extended Unique Identifier
LLC	Logical Link Control
LNS	LoraWan® Network Server
MA	Minor Alarm
MAC	Media Access Control
PER	Packet error rate
RF	Radio Frequency
RSSI	Radio Signal Strength Indicator
SA	Severe Alarm
SNR	Signal Noise Ratio
THOLD	Threshold
TTI	The Things Industries
TTN	The Things Network
WSN	Wireless sensor Network

1.1   VISUAL SYMBOLS DEFINITION

Tip or Information : Provides advice and suggestions that may be useful when installing Satevis™ sensors

Caution– Alerts the user with important information about Satevis® sensors, if this information is not followed, the equipment /software may fail or malfunction.

Danger – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur.

2 CONNEXION TO COMMONSENSE™

Weblink to our cloud software:

https://beanair.cs-vm2m.net/index/logout/homepage

Enter your Login and Password then click on Connect
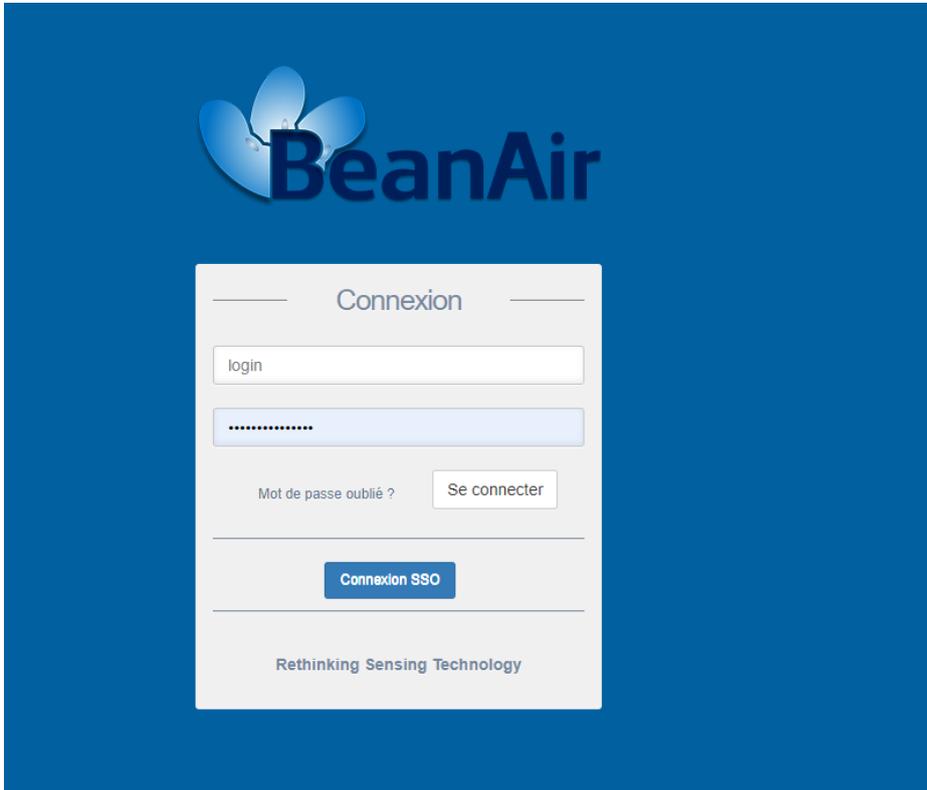
2.1 UPDATING YOUR ACCOUNT PROFILE

Before to start your monitoring application, your account profile should be updated :

- Your email to receive alarms

- Change Time Zone

Time zone is an important setting as Satevis® device transmits timestamped data measurement with UTC clock information, it should be updated with your TimeZone.

If you have decided to re-deploy your Satevis® sensor in another time zone, the Time Zone should be update from your account profile.

There are two ways to access to your account profile:

- Click on your Picture Icon (left top side of your window)
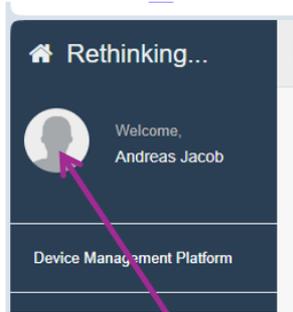
Access to your profile

- Click on the scroll list on the top-right side of your window, then click on Information:
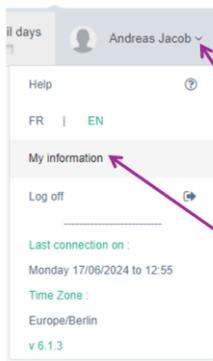
1. Click on the scroll bar

2. Click on My Information

You have reached your profile account, you can start to update your Time Zone

Modify my Service Provider account

General

Name *	JACOB
	maximum 32 char.
First name	Andreas
	maximum 32 char.
Email for notification *	tech-support@beanair.com
	used exclusively for automatic alarm notifications, an email containing the connection information will be automatically sent upon validation of this form, at max 64 chars
Fixed phone number	
	at max 16 chars
Mobile phone number	
	Warning, only French phone numbers can start with 0 (or +0), at max 16 chars
Fax	
	at max 16 chars

Complementary information

Language	English
Time Zone	America/Montreal
Home page	List of Devices

Cancel   Validate

You will reach your Main page
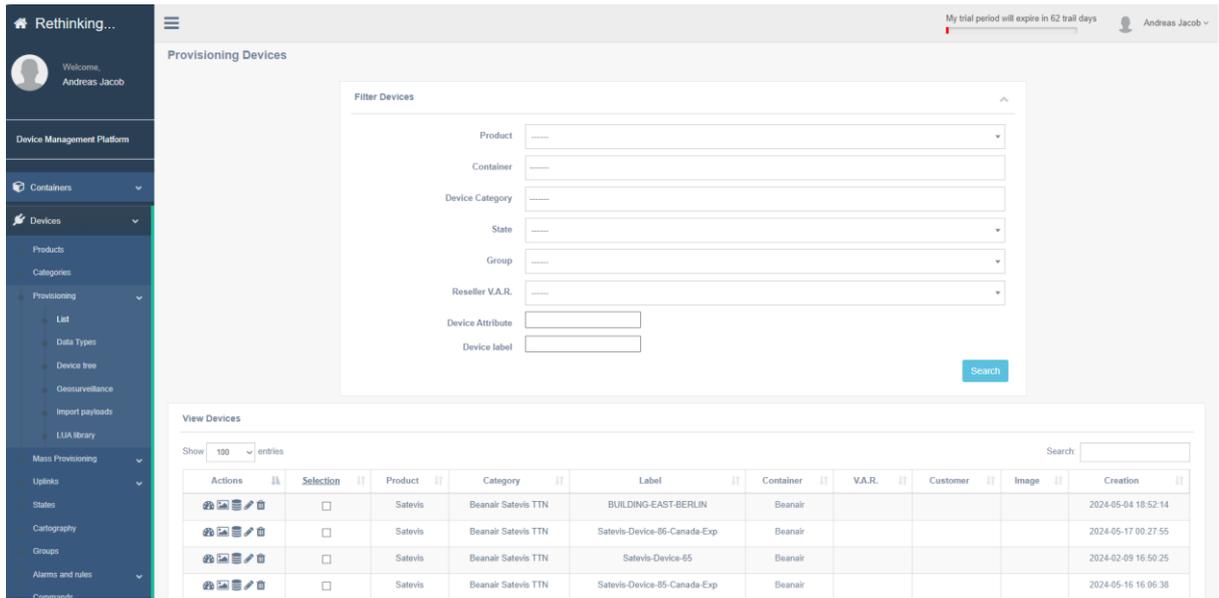
On the Left window, you will have access to all functionalities:

Products Provisioning Interface

Categories of Products

Contains all the Satevis Device provisioned on your CommonSense Platform

Device Tree Organization

Contains all the Get/Post Commands to configure your Satevis sensor

Displays all the Measurement data on graphs
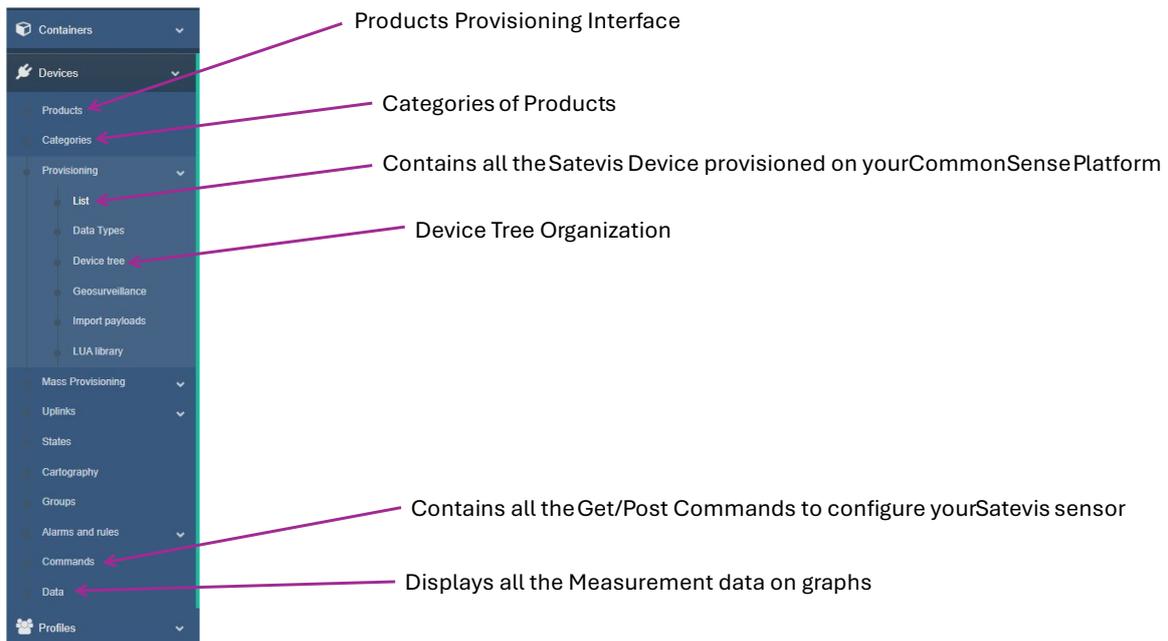
3   REGISTERING A NEW LORAWAN™ GATEWAY

If you are using another Lorawan Gateway, the configuration should be the same.

3.1   CONFIGURING YOUR SENSECAP M2 GATEWAY

For SenseCAP® M2 Gateway Indoor or Outdoor version, you should to configure your Gateway with CommonSense® server address.

- **Server Address :** ttn.vm2m.net
- **Server Port (Up/Down) :** 1700

Go on **Lora => Lora Network :**

Please read **SenseCap® M2 Quickstart** for more information about your Gateway configuration.

3.2   START YOUR LORAWAN® GATEWAY REGISTRATION

Go to **Devices ⇒ Products**, select a Product in the list by clicking on the ✚ icon related to your SensCap M2 gateway.
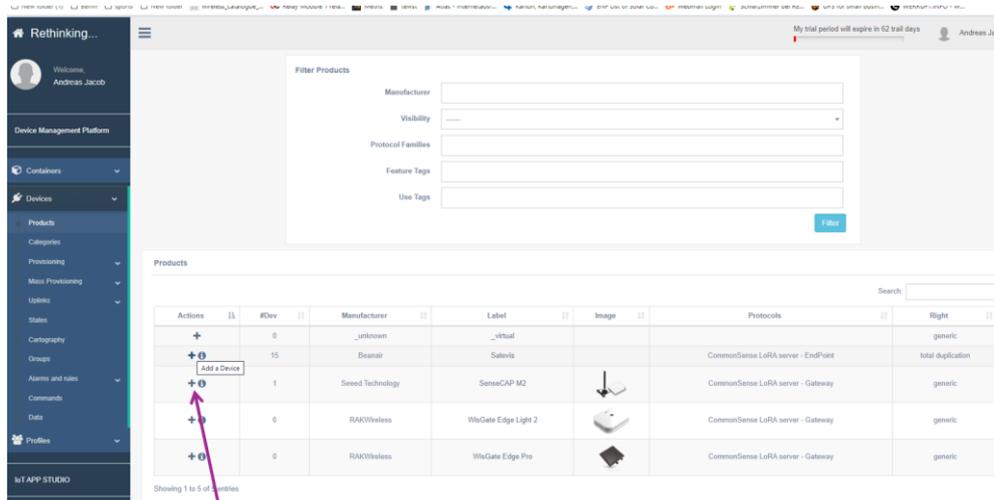
Click on Add a device to provision a new Gateway

3.2.1   General Field

The following fields are mandatory:

Label : Enter your device label, the label should be unique.

Zone : Your Time Zone can not be changed from this area, go to account section for changing your Time for all Satevis® device ;

Provisioning Mode: 'OTAA mode provision in TTN v3 version on the backend Vm2m Gateway' must be selected. Don't use other settings available on the scroll list.

Container : Link your gateway to your container

Alarm notification : you can leave it disable as currently not exploited on SenseCAP M2

Working state Delay : Timeout value on no-data received on Gateway, then the Gateway status change to STOPPED. Default Value is 24h

General

Label *	LoraWanGateway-Berlin
	mandatory
Provisioning mode	OTAA mode provision in TTN v3 version on the backend Vm2m Gateway ▼
Manufacturer ID	
	Optional external ID defined by the Manufacturer
Container	GENERAL: Beanair ▼
	a Device is always linked to a Container
Time Zone	Europe/Berlin ▼
Alarm Notifications	Activated ▼
"Working" state delay	By default the delay configured in the Category : 24 h ▼
	period after which a Device loses its "WORKING" state if no messages are received by the server
Description	

Geolocation

3.2.2 Geolocation

This field is not mandatory but you can use it to enter your Gateway geo-location.

3.2.3   Attributes

The following values are Mandatory:

- **Gateway ID :** You can leave the existing default string value generated by CommonSense®. But if you need to replace it, we suggest you to use *"eui-<gateway_eui>"*, with *<gateway_eui>* to replace with the gateway's EUI. **Make sure your gateway ID comes with lower case.**

- **Gateway EUI:** Enter your Gateway EUID available on your SenseCAP M2. IMPORTANT : **Make sure your gateway ID comes with lower case.**

- **Gateway KEY:** leave this field with default value OLD_GATEWAY as this was used on old Lorawan application (should be removed in the future)

- **Placement :** you can select Indoor or Outdoor

ℹ️ *It's not requested to specify Frequency Plan when a LoraWan® Gateway is registered on CommonSense® as you are using a private network.*

Make sure your Lorawan® Gateway Frequency Plan is the same than your Satevis® sensor Region, otherwise your sensor will not connect to your gateway

4 MANAGING YOUR LORAWAN® GATEWAY

Go on **Devices => Provisioning => List**

Filter Devices Frame, Click on Device Category to select Lorawan™ gateway. In this example, it's a Gateway Sense CAP M2 from Seeed Technology.
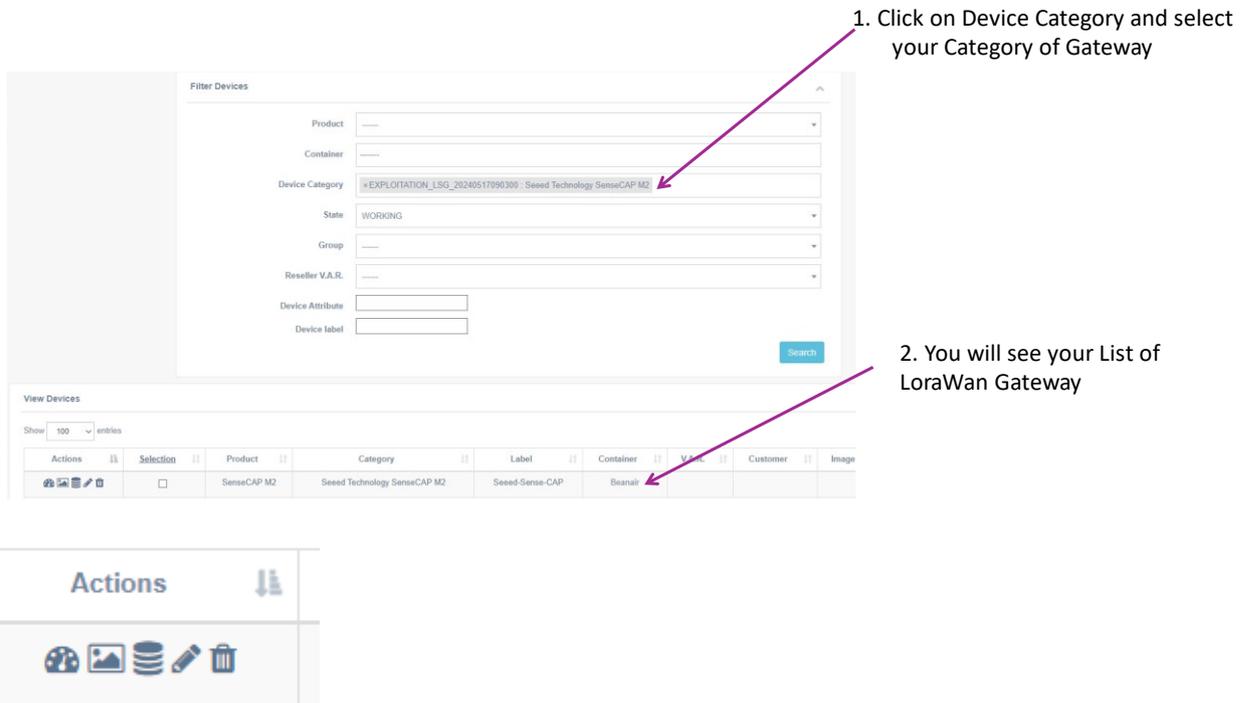
1. Click on Device Category and select your Category of Gateway

2. You will see your List of LoraWan Gateway

On action Window , select , you have multiple options:

- Access to your LoraWan™ Gateway Dashbooard

- Uploading a picture related to your gateway

- Relationship to Protocols/Backends

- Modify your LoraWan™ Gateway settings

- Delete your Lorawan™ Gateway from your CommonSense® LNS

4.1   DASHBOARD

Dashboard displays status of LoraWan® gateway, on View State you can see the status of the device:

View State

State	WORKING
Date	2024-05-29 17:15:00

In the case if your LoraWan® Gateway was freshly registered , it will take a couple of minutes before to see the status changing to WORKING.

≡

Dashboard : Seeed Technology SenseCAP M2 - SeedStudioGateway

View State

State	UNAVAILABLE
Date	2024-06-24 18:32:30

Last Data displays number of uplinks account

Last data

Data Type	Uplink count
Data	159426
Last data date	2024-06-24 21:14:58

Graph will display evolution of Uplinks
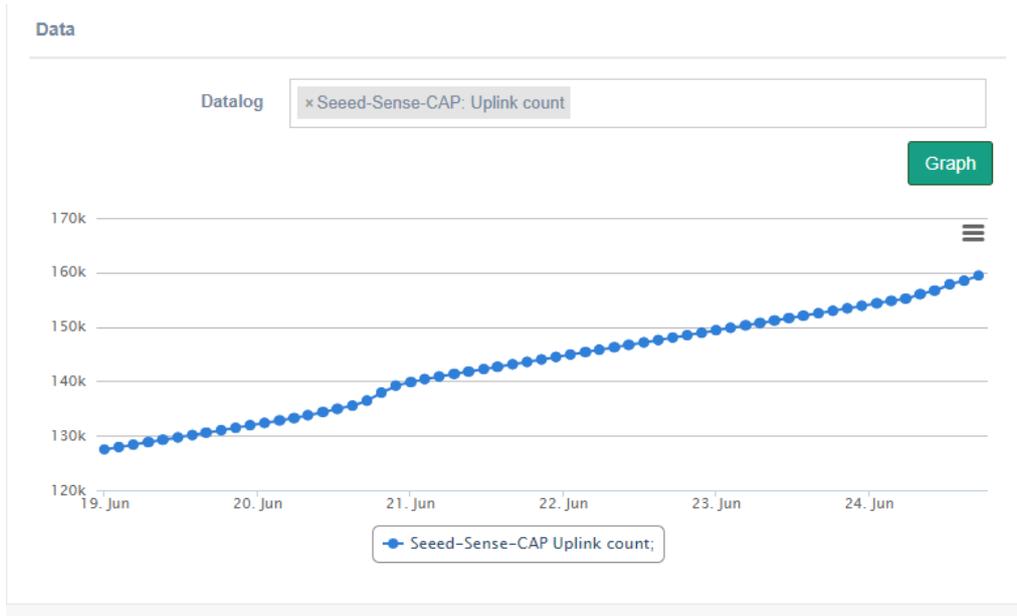
Dynamic Attributes

Displays your Gateway ID, Gateway EUI and Gateway KEY . For security reasons there is no screenshot.

4.2   UPLOADING A PICTURE

User can upload a picture related the Lorawan Gateway®

4.3   MODIFY

User can Modify the LoraWan Gateway® from this window ,
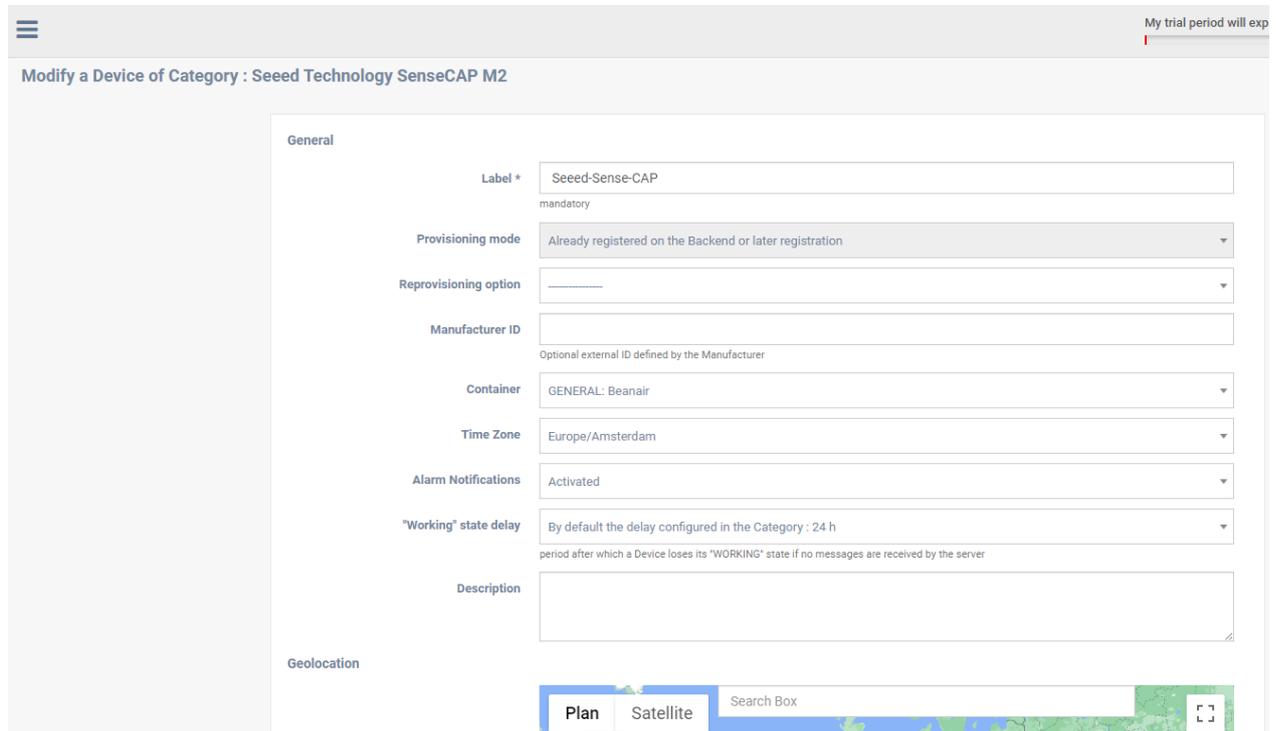
Modify a Device of Category : Seeed Technology SenseCAP M2

General

Label *	Seeed-Sense-CAP
	mandatory
Provisioning mode	Already registered on the Backend or later registration
Reprovisioning option	_____
Manufacturer ID	
	Optional external ID defined by the Manufacturer
Container	GENERAL: Beanair
Time Zone	Europe/Amsterdam
Alarm Notifications	Activated
"Working" state delay	By default the delay configured in the Category : 24 h
	period after which a Device loses its "WORKING" state if no messages are received by the server
Description	

Geolocation

Plan   Satellite   Search Box

4.4   DELETING YOUR LORAWAN GATEWAY® FROM COMMONSENSE®

⚠ **Important :** Don't use forcing option, otherwise you can not register your gateway with the same EUI again.

Select option : **Only if successful deletion on the remote backend(s)**

Then click on delete
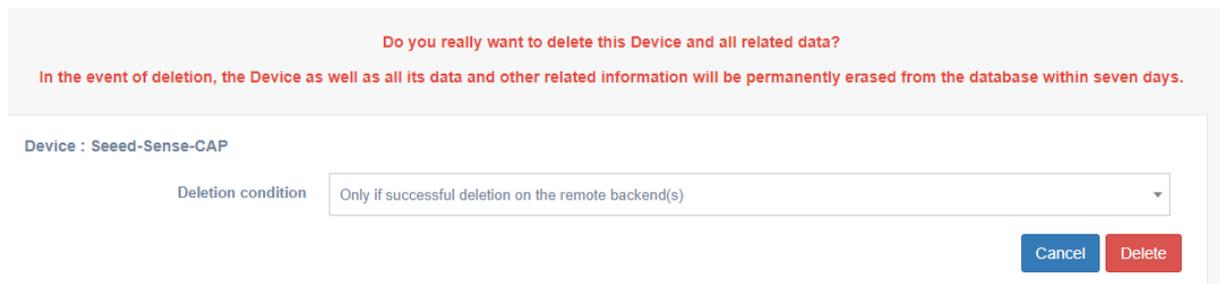
Do you really want to delete this Device and all related data?

In the event of deletion, the Device as well as all its data and other related information will be permanently erased from the database within seven days.

Device : Seeed-Sense-CAP

Deletion condition   Only if successful deletion on the remote backend(s)

Cancel   Delete

5   REGISTERING A NEW SATEVIS® SENSOR

Go to **Devices ⇒ Products**, select a Product in the list by clicking on the ✚ icon related to your Satevis® device.
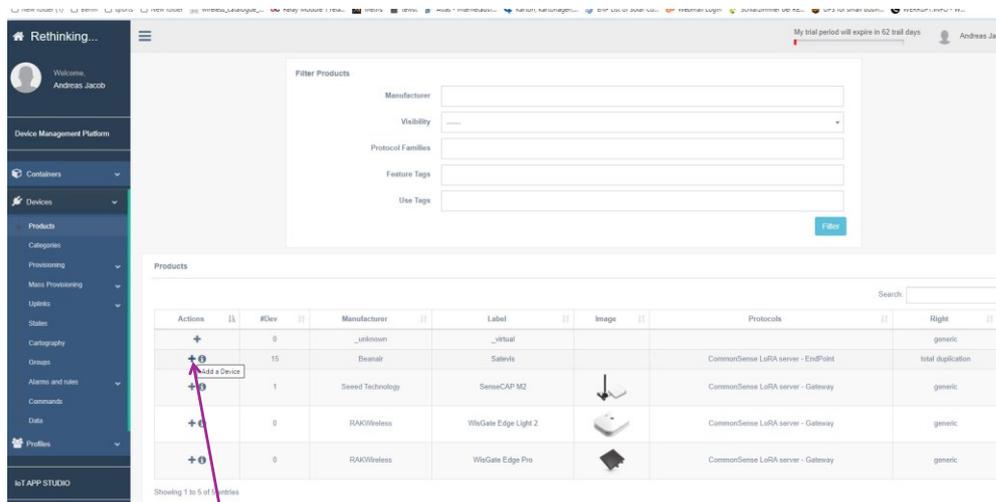
Click on Add a device to provision a new Satevis® device

You will see a window with two different methods of Satevis® device registration:
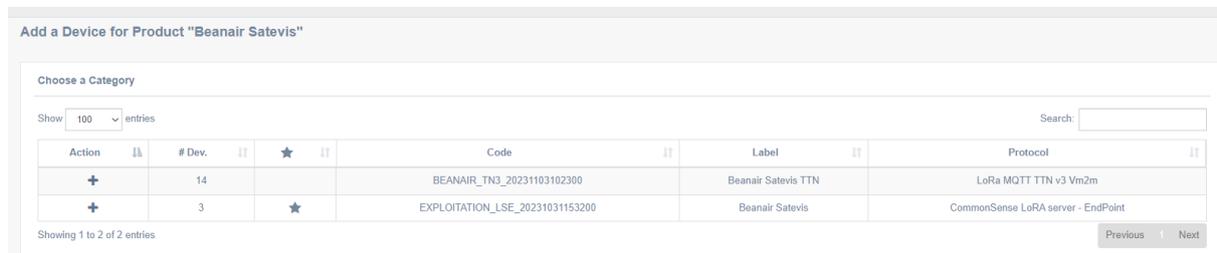
Then click on + ON **Exploitation_LSE_NUMBER** , see screenshot below

ℹ️ *Exploitation LSE is the LNS provided by Vertical M2M, and enables a direct connection between Satevis® sensor and CommonSense® without creating a TTN account.*

The other method 'Beanair_TTN3_XX' is for users connecting their devices to TTN with an option of packet forwarding to Commonsense by using MQTT Protocol. Don't use this method except if it's requested by Beanair sensors or Vertical M2M.

5.1.1 General Field

Add a Device of Category : Beanair Satevis

General	
Label *	Berlin_Mitte_haus79
	mandatory
Provisioning mode	OTAA mode provision in TTN v3 version on the backend
Manufacturer ID	
	Optional external ID defined by the Manufacturer
Container	GENERAL: Beanair
	a Device is always linked to a Container
Time Zone	Europe/Berlin
Alarm Notifications	Activated
"Working" state delay	1 h
	period after which a Device loses its "WORKING" state if no messages are received by the server

Label : Enter your device label, the label should be unique.

Time Zone : The Time Zone here doesn't impact the Time Zone on log Exported data measurement and Data Visualization;

Provisioning mode:

Provisioning Mode: 'OTAA mode provision in TTN v3 version on the backend' must be selected. If other settings than this one are used, your sensor will not connect to CommonSense® and you need to delete your sensor and restart the process again.

Container : Link your gateway to your container

Alarm notification : you can leave it disable as currently not exploited by Satevis® sensor

Working state Delay : Timeout value on no-data received on Gateway, then the DEVICE status change to STOPPED. Default Value is 24h. In the example the Timeout is 1h

5.1.2 Attributes : DevID, DevEUI, AppKey and GatewayID

Attributes	Description
DevID	Used to Identify Satevis® sensor, **⚠ Use only lower case 0..9..a..z, don't use special characters or higher case, max size 36 chars** This ID doesn't need to be recorded on your Satevis® device
DevEUI	Use the 64-bytes DevEUI available on your Satevis® device. Device EUI is not the same than DevID, the device EUI is the unique Identifier provided with your Satevis® device. **⚠** It should be registered without upper score char : **00-80-E1-01-01-51-55-79** should be entered **0080E10101515579** This ID is displayed on your Satevis® device Label (back side), you can also find it on your Satevis® Link software.
AppEUI/JoinEUI	Use the AppEUI provided by commonsense® **AppEUI /JoinEUI should be updated on your Satevis® device by using Satevis® Link software.**
AppKey	**AppEUI was renamed Join EUI** on Latest Lorawan™ specs, but these are exactly the same settings. AppKey is randomly generated by CommonSense® and is more secured than the fixed AppKey available on your Satevis® sensor. **AppKey should be updated on your Satevis® device by using Satevis® Link software.**
Gateway ID	**Use the Gateway ID already registered on CommonSense®** Your Lorawan™ gateway should be registered before to register your Satevis™ sensor.

Example of a correct Satevis® sensor registration:

Label : enter your label here

VERY IMPORTANT : Provisioning Mode should be configured with OTAA mode provision in TTN V3 version on the backend

Working state delay : 1h

General	
Label *	Berlin_Mitte_haus79
	mandatory
Provisioning mode	OTAA mode provision in TTN v3 version on the backend ▾
Manufacturer ID	
	Optional external ID defined by the Manufacturer
Container	GENERAL: Beanair ▾
	a Device is always linked to a Container
Time Zone	Europe/Berlin ▾
Alarm Notifications	Activated ▾
"Working" state delay	1 h ▾
	period after which a Device loses its "WORKING" state if no messages are received by the server
Description	

Geolocation

CommonSense™ window on left and Stevis Link software on the right:

Zone			Lora Configuration	— □ ×

Attributes

DevID	berlinmittehaus79
	Used to identify the Device, max 36 char. 0..9 a..z
DevEUI	0080E10101515579
	16 char. hexa string (64 bits) unique identifier assigned to the device by the chip manufacturer
AppEUI	800000000000000A
	16 char. hexa string (64 bits) assigned by The Things Network
AppKey	07F56E1B3CC69A98CFBB47EC99D66E22
	32 char. hexa string (128 bits)
Gateway ID	e278bc1334afb23db09b183f
	Used to historize witch Gateways transport the payload, must be filled via LUA script
Product ID	Unknown ▾
	Given by the device

Configuration | Configuration Log

Product ID	S_Alpha_Inc_Kompact_10_deg	LoraWan Version	01
	CONNECTED	Firmware Version	V0,3
		Hardware Version	V1,2

Device Stored Values

Device EUI	00-80-E1-01-01-51-55-79
Join EUI	80-00-00-00-00-00-00-0A
App Root Key	07-F5-6E-1B-3C-C6-9A-98-CF-BB-47-EC-99-D6-6E-22
Region Code	REGION_EU868
Join Mode	OTAA

Device Input Values

	00-80-E1-01-01-51-55-79
	80-00-00-00-00-00-00-0A
	07-F5-6E-1B-3C-C6-9A-98-CF-BB-47-EC-99-D6-6E-22
	REGION_EU868	REGION_EU868
	OTAA	OTAA

Get Config | Validate

Gateway ID can be found on your LoraWan™ gateway Dashboard

Longitude	0	
Time Zone	Europe/Paris	▼
Description		

Dynamic Attributes

Gateway ID	e278bc1334afb23db09b183f	
Gateway EUI	2cf7f11053100184	
Gateway KEY	OLD_GATEWAY	
Placement	indoor	▼
Description		

Example of wrong settings:

{"info":409,"body":"{\"code\":6,\"message\":\"error:pkg\/identityserver:end_device_euis_taken (an end device with JoinEUI `800000000000000A` and DevEUI `0080E10101515579` is already registered as `leipzigdevice79` in application `commonsense`)\",\"details\":[{\"@type\":\"type.googleapis.com\/ttn.lorawan.v3.ErrorDetails\",\"namespace\":\"pkg\/identityserver\",\"name\":\"end_device_euis_taken\",\"message_format\":\"an end device with JoinEUI `{join_eui}` and DevEUI `{dev_eui}` is already registered as `{device_id}` in application `{application_id}`\",\"attributes\": {\"application_id\":\"commonsense\",\"dev_eui\":\"0080E10101515579\",\"device_id\":\"leipzigdevice79\",\"join_eui\":\"800000000000000A\"},\"correlation_id\":\"0d094a3cb4964eda94cd7483f08ead87\",\"code\":6}]","header":{"HTTP\/2 409":"","cache-control":"no-store","content-type":"application\/json","date":"Tue, 25 Jun 2024 13:56:40 GMT","pragma":"no-cache","referrer-policy":"strict-origin-when-cross-origin","x-content-type-options":"nosniff","x-frame-options":"SAMEORIGIN","x-request-id":"01J17TYCECB27THYE0XYHJNW07","x-xss-protection":"1; mode=block","content-length":"706",":":""},"verbose":"* Trying 10.0.64.12:2443...\n* Connected to ttn.vm2m.lan (10.0.64.12) port 2443 (#0)\n* ALPN, offering h2\n* ALPN, offering http/1.1\n* successfully set certificate verify locations:\n* CAfile: \/etc\/ssl\/certs\/ca-certificates.crt\n* CApath: \/etc\/ssl\/certs\n* SSL connection using TLSv1.3 \/ TLS_CHACHA20_POLY1305_SHA256\n* ALPN, server accepted to use h2\n* Server certificate:\n* subject: CN=ttn.vm2m.lan\n* start date: Sep 8 08:12:00 2022 GMT\n* expire date: Dec 5 08:12:00 2051 GMT\n* issuer: CN=TTN Vertical M2M CA\n* SSL certificate verify result: unable to get local issuer certificate (20), continuing anyway.\n* Using HTTP2, server supports multi-use\n* Connection state changed (HTTP/2 confirmed)\n* Copying HTTP/2 data in stream buffer to connection buffer after upgrade: len=0\n* Using Stream ID: 1 (easy handle 0x5575c1299600)\n> POST \/api\/v3\/applications\/commonsense\/devices HTTP/2\r\nHost: ttn.vm2m.lan:2443\r\naccept: *\/*\r\ncontent-type: application\/json\r\nauthorization: Bearer NNSXS.PFTQXNAR7EGK7XK75QQ34WRLJKQ4ZYJHOTQMYIA.N6556IJIOMRC4HX7E4SG6KUD2757Z2NX2UQIBOSLETQZZB6W2JPQ\r\ncontent-length: 332\r\n\r\n* We are completely uploaded and fine\n* Connection state changed (MAX_CONCURRENT_STREAMS == 250)!\n< HTTP/2 409 \r\n< cache-control: no-store\r\n< content-type: application\/json\r\n< date: Tue, 25 Jun 2024 13:56:40 GMT\r\n< pragma: no-cache\r\n< referrer-policy: strict-origin-when-cross-origin\r\n< x-content-type-options: nosniff\r\n< x-frame-options: SAMEORIGIN\r\n< x-request-id: 01J17TYCECB27THYE0XYHJNW07\r\n< x-xss-protection: 1; mode=block\r\n< content-length: 706\r\n< \r\n* Connection #0 to host ttn.vm2m.lan left intact\n"}

6   MANAGING YOUR SATEVIS™ DEVICE

Go on **Devices => Provisioning => List**

Filter Devices Frame, Click on Device Category to select Satevis™ sensors
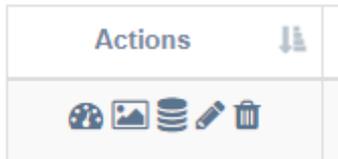
On action Window , select , you have multiple options:

- Access to your Satevis™ device Dashbooard

- Uploading a picture related to your device

- Relationship to Procotols/Backends

- Modify your Satevis™ device settings

- Delete your Satevis™ device from your CommonSense® LNS

6.1   YOUR SENSOR DASHBOARD

Your Satevis® device Dashboard is accessible from **Devices => Provisioning => List**

In Filter Devices Filter frame, Device category field select Beanair Satevis®

Click on Dashboard Icon

You should see the following window:

6.2 VIEW STATE FRAME

From this window, user can check the Sensor Status : WORKING or not WORKING.

View State

State	WORKING
Date	2024-06-13 04:29:26

6.3 LAST INFORMATION FRAME

Last data type , data value and last data date are displayed here:

Last data

Data Type	RSSI
Data	-97
Last data date	2024-06-17 22:18:16

6.4 DEVICE FRAME

Displays your device Label, Time Zone and location

Device

Label	BUILDING-EAST-BERLIN
Latitude	0
Longitude	0
Time Zone	Europe/Berlin
Description	

6.5   DYNAMIC ATTRIBUTES

These attributes are updated when:

- Satevis® Sensor is registered with Device ID, DevEUI, AppEUI, Appkey ;

- Satevis® Sensor has joined a LoraWan® network, and starts to send it's profile to CommonSense® LNS;

- On user request only: some settings which are not important for device operation are transmitted on user request. We will see this on this section;

- Some Attributes are refreshed periodically : System Diagnostic report is refreshed periodically ;

6.5.1   Sensor Channels organization

Before to describe all Attributes, it's important to Highlight how Sensor Channels are organized:

Satevis® product	Sensor channels organization
Satevis® Alpha-Inc and Satevis® Alpha Inc Kompakt	**Channel 0 :** Inclinometer X Axis **Channel 1 :** Inclinometer Y Axis **Channel 2 :** Inclinometer Z Axis **Channel 3 :** Internal Temperature
Additional External Temperature Humidity Sensor	**Channel 4 :** External Temperature **Channel 5 :** External Humidity

6.5.2   Attributes created during sensor registration

Device ID, DevEUI, AppEUI and AppKey are displayed on this field.

6.5.3   Attributes transmitted in Main Profile during device startup

6.5.3.1   Firmware/Hardware/LorWan® Versions

Versions information are transmitted in Main Profile message during Satevis® device startup:

Screenshot	Field	Description
Product ID — Satevis Alpha-Inc ±10° Message Version — V0.1 Device Hardware Version — V1.2 Device Firmware Version — V0.5 Lora Application Version — V1.1.0 Middleware Lorawan Version — V2.3.0 Middleware SubGHZ Version — V1.1.0	Product ID	Product ID used : • Satevis® Alpha-Inc • Satevis® Alpha Inc Kompakt
	Message Version	POST/GET Commands Message versions
	Satevis® device Hardware Version	Displays Hardware Version of Satevis® Device
	Device Firmware version	Displays Satevis® device firmware version. If the firmware is updated , this version is incremented. If a new firmware is uploaded on the device the version is incremented.
	Lorawan Application layer	Current version is V1.1.0
	Middleware LoraWan version	Current version is V2.3.0
	Middleware SubGhz version	Version V1.1.0 corresponds to High Power transmission radio +22dBm Version V1.2.0 corresponds to Low Power transmission radio +14dBm

6.5.3.2   Lora Region code

Region code information is transmitted in Main Profile message during Satevis® device startup .

Region code can be changed from your Satevis® Link software. Please consult Satevis® Link quick start for more info : click here.

6.5.3.3   Re-join frequency

Re-Join Frequency information is transmitted in Main Profile message during Satevis® device startup , this setting can be remotely changed via Commonsense.

Lorawan® Re-join frequency is displayed in hours.

Satevis® device automatically initiate a re-join process in the case the connection with the LNS is lost.

To not decrease the battery life, Rejoin Frequency can be configured between 1h to 255h.

Connection to LNS can be lost due to different reasons:

- LoraWan® Gateway disconnect and reconnect after a long period due to power problem,

- LoraWan® Gateway settings are changed (frequency plan changes, Gateway firmware update)

- Lorawan® Gateway is changed on the monitoring site;

Please note , CommonSense® is using a private LNS, Satevis® device will work only with the Lorawan Gateway which was linked with your Satevis® device.

6.5.3.4   GPS module

Currently GPS Module is not available on Satevis® sensor.

6.5.3.5   Monitoring parameters and all timing values

These parameters are transmitted to CommonSense® after Satevis® sensor startup.

In the case if CommonSense® didn't receive, user can send a Get Command to refresh these info.

Screenshot	Field	Description
Available Monitoring Modes STOP + All Static Monitoring Monitoring Mode Slow Monitoring Mode Data Backup Enabled Max. Number of data samples 7 Monitoring Refresh Rate (s) 120 Alarm Monit. Refresh Rate (s) 20 Keep-Alive Refresh Rate (s) 120 System Diag. Refresh Rate (s) 600	Available Monitoring Mode	Available Monitoring on Satevis® device: STOP Slow Monitoring Alarm Monitoring This field doesn't display current Monitoirng Mode.
	Monitoring mode	Displays current Monitoring Mode
	Data Backup	If Data backup is enabled Lost data due to network disconnection is backed up and transmitted later. Data backup is currently not available
	Max Number of Data samples	Defines max number of data samples per sensor channel in an unique message transmitted to the LNS IMPORTANT: This parameter is only available for Slow Monitoring Mode, and helps to extend battery life by transmitting several daata samples in a message. Example : If the user define 8 data measurements in a message and MRR = 5 minutes, the message containing data measurements is transmitted every 40 minutes.
	Monitoring Refresh rate (MRR)	Monitoring Refresh RATE in seconds from 20s to 86400s (1 data acquisition per day) . Defines the periodicity of data acquisition, it doesn't define the periodicity of data transmission. Important : In the case of Slow Monitoring Mode , Satevis® device will send a message when all the measurement samples are collected. Unit : seconds
	Alarm Monitoring refresh Rate (AMRR)	Monitoring Refresh rate when an alarm threshold is reached, user can choose a faster data acquisition and transmission in the case if an alarm threshold is reached. This condition must be respected : AMRR < MRR.

		Important : Satevis® device will restrict the value to MRR if AMRR > MRR. **Unit : seconds**
	Keep Alive Refresh Rate (KARR)	When Alarm Monitoring mode is configured, Keep alive refresh rate corresponds to a periodic notification message in the case of no alarm present. **The value should be a multiple of MRR.** **Important:** Satevis® Device will update KARR value to reach a multiple of MRR **Example:** If user enters KARR= 664 seconds and the Monitoirng Refresh Rate (MRR) is 60seconds , Satevis device will change KARR to 660 seconds as it should be a multiple of MRR **Unit : seconds**
	System Diag Refresh rate (SDRR)	System status Refresh Rate can not be faster than Monitoirng Refresh Rate (MRR) Value in seconds, the value should be a multiple of MRR **Important:** Satevis Device will update SDRR value to reach a multiple of MRR **Example:** If SDRR= 855 seconds is entered and the Monitoirng Refresh Rate (MRR) is 60seconds , Satevis device will update SDRR to 660 seconds as it should be a multiple of MRR **Unit : seconds**

6.5.3.6   Datalogger

Currently datalogger function is not available. Planned for Q4-2024. As LoraWan® is not designed for fast data transmission, datalogs can be downloaded from Satevis® Link software by using the USB adapter.

6.5.3.7 Power supply status

Diagnostic report is transmitted during Satevis® sensor startup after the Main & Sensor profile.

Power supply status is transmitted frequently to the LNS, user can change periodicity with the Command '**SET System Diag Settings'.**

Battery Voltage and Internal Temperature measurement are directly available on Data section .

Screenshot	Diag Info	Description and values
Power Source — Primary cell pack; Battery Power Status — Battery Saver Mode; Battery Level Status — Very Good; Battery Diagnostic — Battery Good	**Power Source**	**Displays from which power source the device is operating:** **USB Power or Primary Cell Pack**
	Battery Power Status	**Displays battery Power Status:** • **Battery saver mode : battery is working properly with optimized power saver mode** • **Battery powered OFF by user** • **Battery not present : disconnected by user** • **Standby Low Battery : battery needs to be changed**
	Battery Level Status	**Displays different levels of battery:** • **Battery level is very Low** • **Battery level is low** • **Battery level is medium** • **Battery level is Good** • **Battery level is Very Good**
	Battery Diagnostic	**Displays battery Diag:** • **Battery Good** • **UnderVoltage : Battery Voltage too low for normal operation, must be changed ;** • **Overvoltage : High Battery Voltage, further actions should be taken** • **Info Battery Not available (case of battery power switched off or No Battery Available)**

6.5.4 Attributes transmitted in Sensor Profile during device startup

6.5.4.1 Alarms Settings status

Diag Info	Description and values
Alarm Notification Rule	**Displays from which power source the device is operating:** **USB Power or Primary Cell Pack**
Channel 0 : Inclinometer Axis X **Channel 1 : Inclinometer Axis Y** **Channel 2 : Inclinometer Axis Z** **Alarm Conf.**	**Status 1: Alarm Enabled/Disabled** **Status 2 : Alarm Threshold : High/Low/Mixed** **Status 3 : Minor Alarm value** **Status 4: Severe alarm value** **Status 5: Critical Alarm value**
Channel 3 **Alarm Conf.** **Internal Temperature (unit °C)**	
Channel 4 **Alarm Conf.** **External sensor 1**	
Channel 5 **Alarm Conf.** **External sensor. 2**	

See section **Sensor Channels organization** for more information about your External sensor channels.

Display Example with external Temperature/Humidity sensor:

Alarm Notification rule	Logical OR Alarm
Channel #0 Alarm Conf.	;Enabled;Mixed;7.9980;4.9988;2.9993
Channel #1 Alarm Conf.	;Enabled;Mixed;7.9980;4.9988;2.9993
Channel #2 Alarm Conf.	;Enabled;Mixed;7.9980;4.9988;2.9993
Channel #3 Alarm Conf.	;Enabled;High;50.02;44.99;40.02
Channel #4 Alarm Conf.	;Enabled;High;64.00;57.00;55.00
Channel #5 Alarm Conf.	;Enabled;High;76.00;73.00;72.00

Channels	Sensor	Alarm Enabled/Disabled	Alarm Threshold	Critical Alarm (CA)	Severe Alarm (SA)	Minor Alarm (MA)	Alarm Thresholds Organization
CH0	INC X	Enabled	Mixed Alarm THOLD	7.9980°	4.9988°	2.9993°	|CA| > |SA| > |MA| Absolut Values
CH1	INC Y	Enabled	Mixed Alarm THOLD	7.9980°	4.9988°	2.9993°	|CA| > |SA| > |MA| Absolut Values
CH2	INC Z	Enabled	Mixed Alarm THOLD	7.9980°	4.9988°	2.9993°	|CA| > |SA| > |MA| Absolut Values
CH3	INT TEMP	Enabled	High Alarm THOLD	50.02°C	44.99°C	40.02°	CA> SA> MA
CH4	EXT TEMP	Enabled	High Alarm THOLD	64.00°C	57.00°C	55.00°	CA> SA > MA
CH5	EXT HUM	Enabled	High Alarm THOLD	76.00 %RH	73.00 %RH	72.00 %RH	CA > SA > MA

6.5.5   Attributes updated transmitted on user request

6.5.5.1   Inclinometer sensor config status

Inclinometer Sensor status is refreshed on user request.

Inclinometer sensor status displays:

- Inclinometer sensor measuring range

- Hysteresis on sensor range

User can send the Commands:

- **Get Inclinometer Config** to get the latest status of your Inclinometer sensor configuration.

- **SET inclinometer config to configure these two settings**

Example:

Inclinometer measuring range	±10deg
Hysteresis on sensor range	20

Inclinometer measuring range is ±10deg , Hysteresis on sensor range (20 samples has not influence on measuring range as it's static).

To understand more about these settings please read the User Guide, section Uplinks and Downlinks.

6.5.5.2   Sensor zeroing config

Displays the information related to Sensor Zeroing: Enabled or Disabled.

Sensor zeroing can be done by the field operator or remotely via the command '**SET Sensor Zeroing config'.**

Example: Sensor zeroing is Enabled

Sensor Zeroing	Initiate and Enable ▼

6.5.5.3   Sensor zeroing Results

Display the information about Sensor zeroing offsets values and Date related to sensor zeroing/de-zeroing.

Example: Sensor Zeroing was performed 28.05.2024 with values 0.0604/2.8564/-12.0026 on X/Y/Z Axis.

Sensor Zeroing/De-zeroing Date	2024-05-28 14:33:25
Sensor Zeroing Offsets	0.0604;2.8564;-12.0026

6.5.5.4   QuickDiag

QuickDiag function is performed by Satevis® device , it checks if the Sensor is working properly and provides right measurement.

This field is refreshed after receiving a Hello Message

Example of Quick Diag Information not available:

Channel #0 QuickDiag	Unused
Channel #0 Min/Max/Avg	
Channel #1 QuickDiag	Unused
Channel #1 Min/Max/Avg	
Channel #2 QuickDiag	Unused
Channel #2 Min/Max/Avg	
Channel #3 QuickDiag	Unused
Channel #3 Min/Max/Avg	
Channel #4 QuickDiag	Unused
Channel #4 Min/Max/Avg	
Channel #5 QuickDiag	Unused

Example of Quick Diag refreshed after performing a Hello Request on Satevis® sensor:

All sensors channels are working properly

Channel #0 QuickDiag	Working properly
Channel #0 Min/Max/Avg	
Channel #1 QuickDiag	Working properly
Channel #1 Min/Max/Avg	
Channel #2 QuickDiag	Working properly
Channel #2 Min/Max/Avg	
Channel #3 QuickDiag	Working properly
Channel #3 Min/Max/Avg	
Channel #4 QuickDiag	Working properly
Channel #4 Min/Max/Avg	
Channel #5 QuickDiag	Working properly

Sensor channels 4 and 5 are not working properly, these sensor channels are related to External Sensor:

- *External sensor is not connected*

- *External sensor is damaged*

Channel #0 QuickDiag	Working properly	▼
Channel #0 Min/Max/Avg		
Channel #1 QuickDiag	Working properly	▼
Channel #1 Min/Max/Avg		
Channel #2 QuickDiag	Working properly	▼
Channel #2 Min/Max/Avg		
Channel #3 QuickDiag	Working properly	▼
Channel #3 Min/Max/Avg		
Channel #4 QuickDiag	Not working properly	▼
Channel #4 Min/Max/Avg		
Channel #5 QuickDiag	Not working properly	▼

6.5.5.5   Sensor Calibration status

Sensor Calibration status are not transmitted in the message profile. It can be obtained only on user Request (**GET Sensor Calibration Settings**).

For each sensor channel, it displays:

- **Calibrated/Uncalibrated**

- **Date of calibration**

Example: The 6 sensor channels were calibrated the 16.05.2024 at 7:35AM

Channel #0 Calibration   Calibrated on 2024-05-16 07:35:44

Channel #1 Calibration   Calibrated on 2024-05-16 07:35:44

Channel #2 Calibration   Calibrated on 2024-05-16 07:35:44

Channel #3 Calibration   Calibrated on 2024-05-16 07:35:44

Channel #4 Calibration   Calibrated on 2024-05-16 07:35:44

Channel #5 Calibration   Calibrated on 2024-05-16 07:35:44

Calibration values are available on Satevis® Link software.

6.6 COMMAND FRAME

Command can be also transmitted from this window but we suggest you to use Commands window (described later on this user guide) as you don't have access to all the Commands settings from this window.
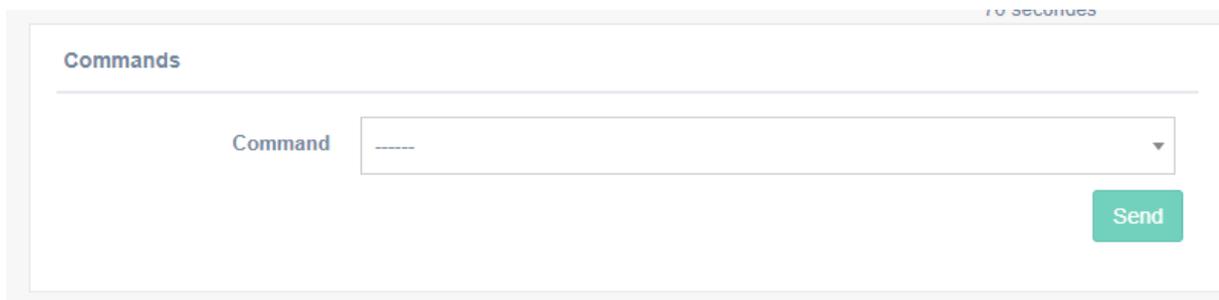
Commands

Command   ------ ▼

Send

6.7 DATA FRAME

You can Visualize your latest graph from this window , but graphs can be deleted if the window is refreshed.

Data

Datalog ×BUILDING-EAST-BERLIN: Inclination X ×BUILDING-EAST-BERLIN: Inclination Y

×BUILDING-EAST-BERLIN: Inclination Z

Graph

BUILDING-EAST-BERLIN Inclination Y
17 Jun 2024, 20:24:04
3,6035 deg
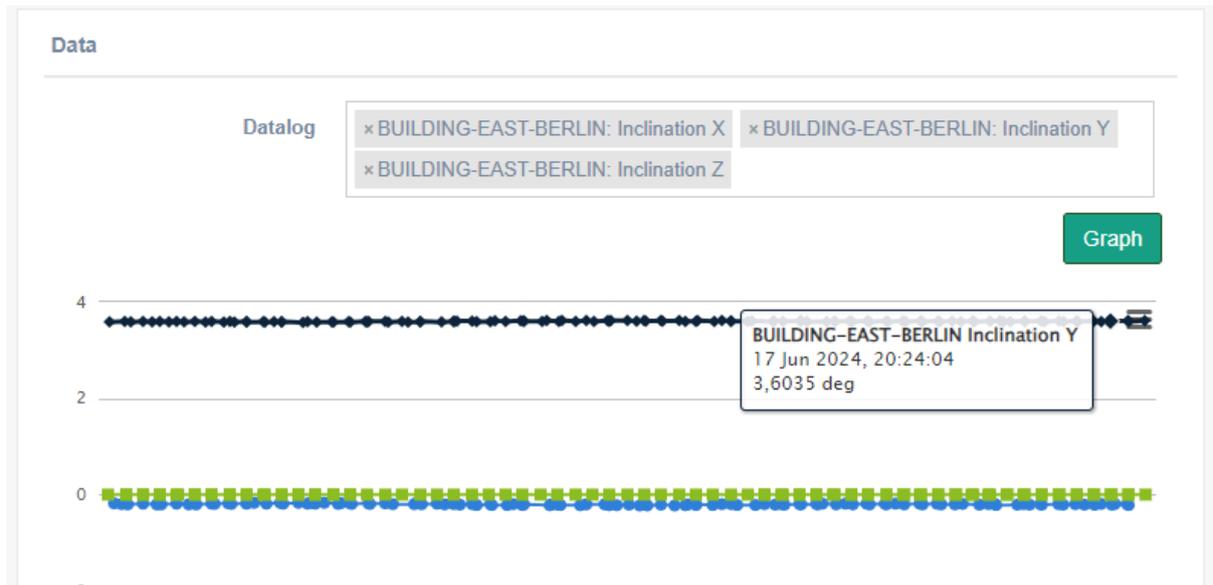
6.7.1 Deleting your device

≡   My trial period will expire in 36

Delete a Device

Do you really want to delete this Device and all related data?

In the event of deletion, the Device as well as all its data and other related information will be permanently erased from the database within seven days.

Device : 79-Leipzig-device

Deletion condition   Only if successful deletion on the remote backend(s)   ▼

Cancel   Delete

Rethinking Sensing 1

7 DOWNLINKS/UPLINKS COMMANDS DESCRIPTION

All Downlinks messages transmitted to Satevis® device are listed on this section.

On **CommonSense®** IOT platform, for better readability for the user all the downlinks messages are named **Commands**.

You will find **Commands** on the Left Menu Devices => Commands then you can configure your Filters to find your devices, then click on search . As selected list of devices will be displayed.

In this example we used the Filter **WORKING**:
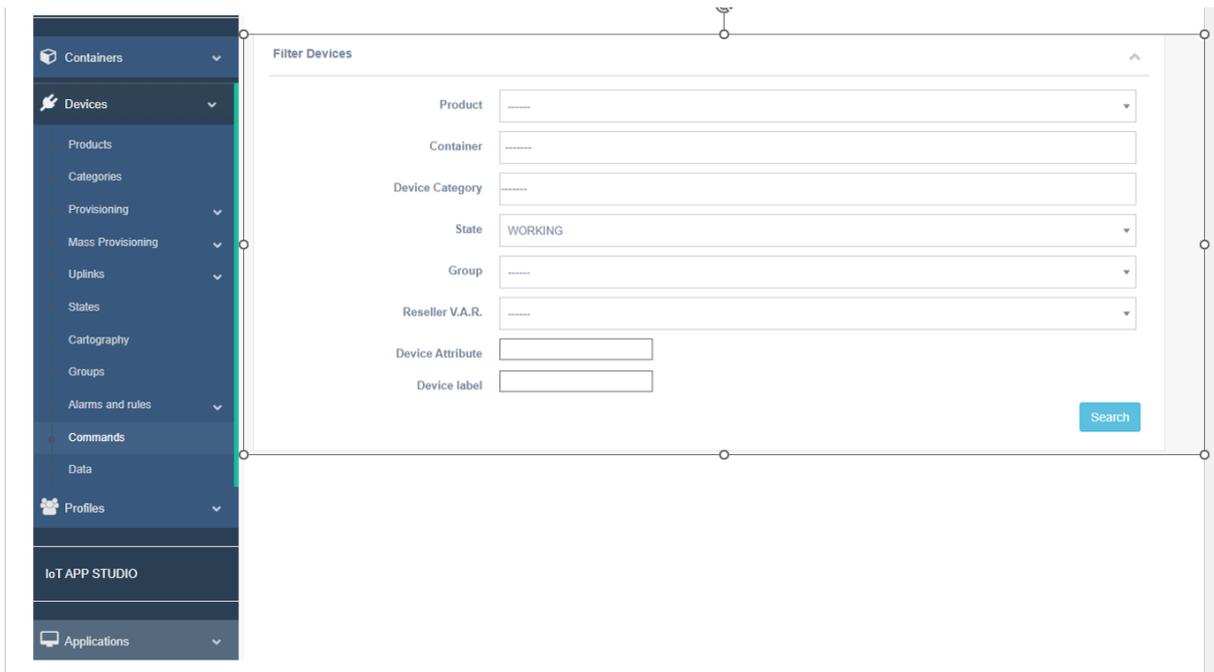
In the Lower Frame named 'Commands", we can see our List of devices to configure:

If you click on the first scroll-list you will find the list of all Commands you can send to your Satevis® device:

Commands

Show [100] entries

Category	Container	Device				Commands	
Beanair Satevis TTN	Beanair	BUILDING-EAST-BERLIN	Set Monitoring Mode Full Config	ⓘ	STOP Monitoring	Provided by LoRa network	En
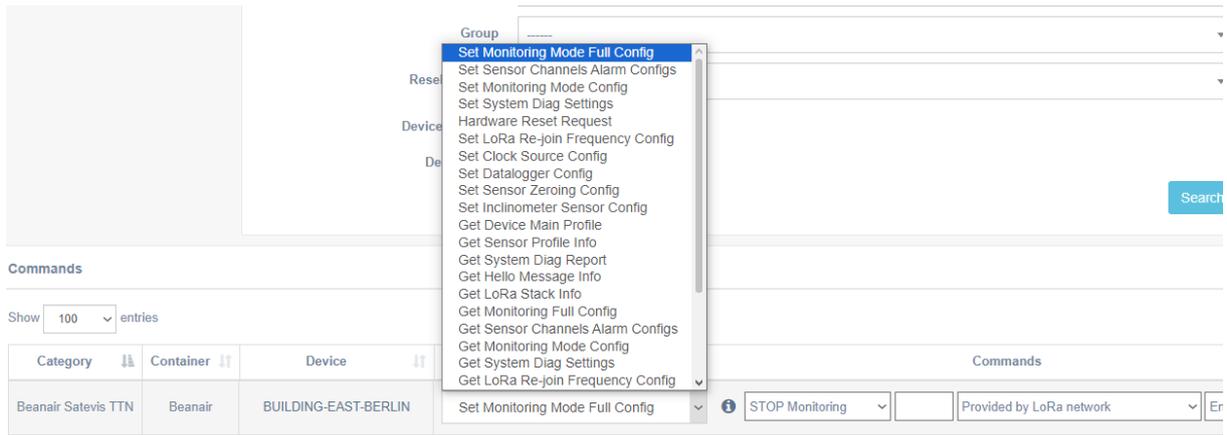
Every Command available on Satevis® device is described on this section.

All the GET/SET commands are transmitted on Lorawan® PORT 19

7.1 SET AND GET COMMANDS

SET/POST Command: When transmitted by Comonsense®, SET Commands contains new settings. Satevis® always resend back the SET command with updates (in the case if there are system limitations, or some rules which were not followed by the user). Our specifications for developers use the Terminology **POST for SET Command,** as it's inspired by HTTP requests**.**
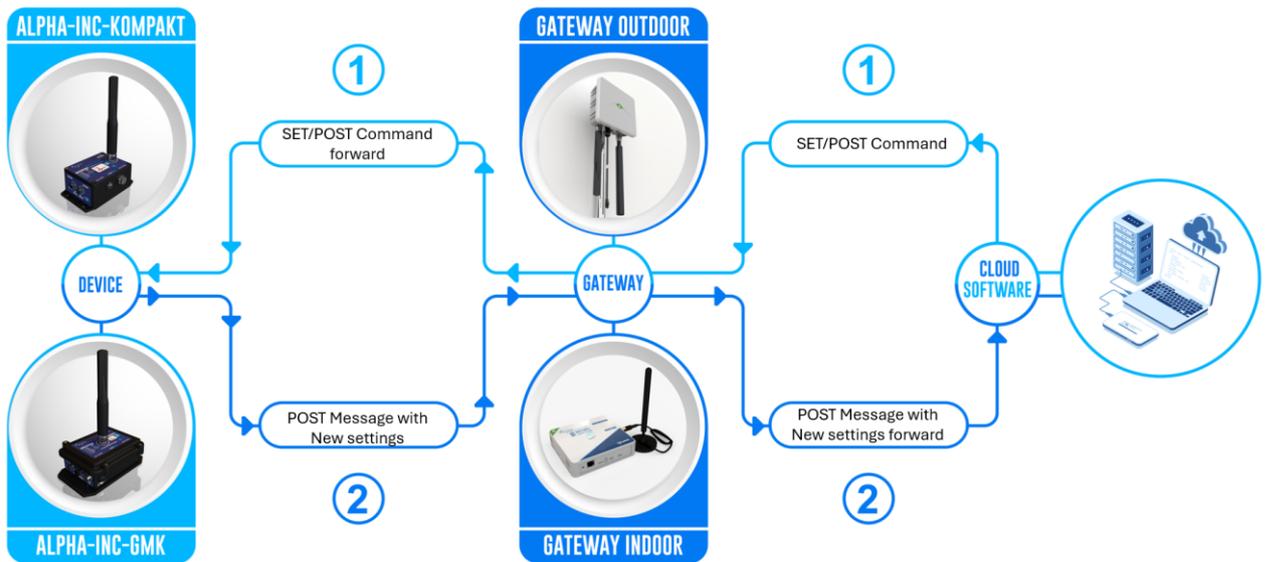
GET Command : GET Request is transmitted by the CommonSense® to read Satevis® device status or to get currents settings. Satevis® device will always answer with a POST message.
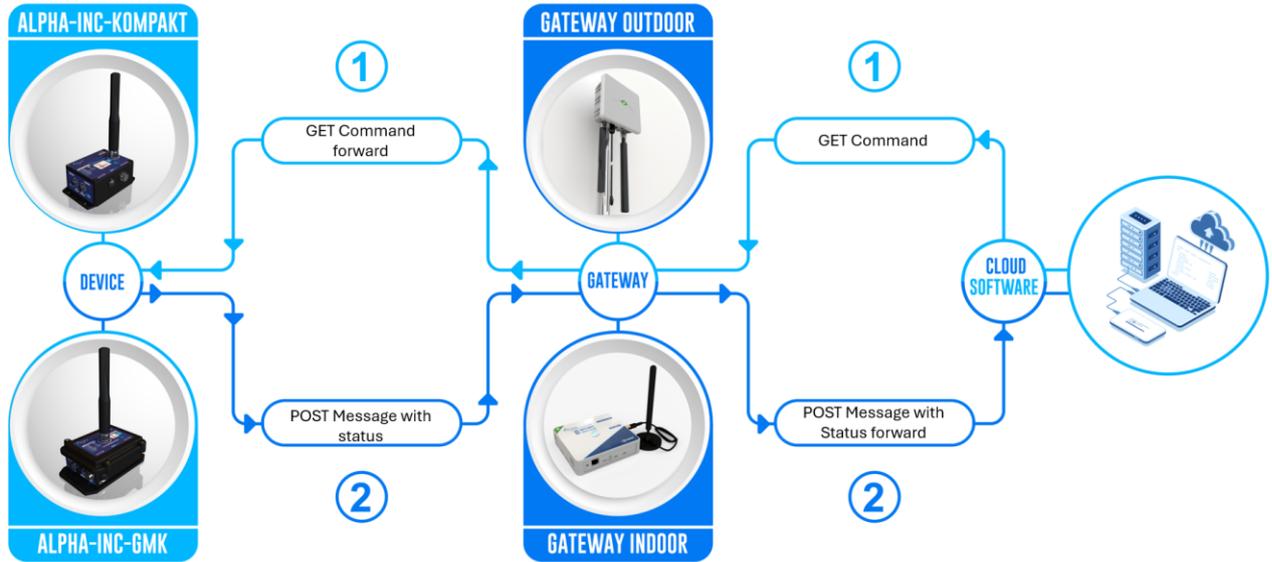
7.2   SET MONITORING MODE FULL CONFIG

SET Command for configuring the Monitoring Mode and all the related timing information

PORT ID : 19

Field	Unit/Pre-selected settings	Description
Monitoring Mode	Pre-selected settings	• **STOP Monitoring :** stops site Monitoring, no data measurement is transmitted by Satevis® device • **Slow Monitoring Mode,** ultra low power operation • **Alarm Monitoring:** Alarm Tracking
Monitoring Refresh Rate (MRR)	Unit: Seconds MIN: 20s MAX: 86400s	Defines the data acquisition frequency, but not transmission frequency. The message containing data measurement is transmitted to the CommonSense® when the Maximum number of data samples have been reached.

Clock source	Pre-selected setting	Currently Clock source is only provided by the LNS on PORT 202. Clock is synchronized during Satevis® device Startup and every 18hours.
Data Backup	*Pre-selected setting*	**Enable :** In the case of network disruption/failure , measurement data with Timestamp is momentary backed-up before to be transmitted later. Disable: data Backup is not activated **Data Backup will be available on Q4-2024**
MAX Number of Samples	*1 to 9 samples max*	Defines max number of data samples per sensor channel in a message transmitted to CommonSense® **IMPORTANT:** This function is only available for Slow Monitoring Mode, and helps to extend battery life by transmitting several data samples in a message. **Example :** If the user define 8 data measurements in a message and MRR = 5 minutes, the message containing data measurements is transmitted every 40 minutes.
Alarm Monitoring Refresh Rate (*AMRR*)	*Unit: Seconds* *MIN: 20s* *MAX: 86400s*	Monitoring Refresh rate when an alarm threshold is reached, user can choose a faster measurement rate in the case if an alarm threshold is reached. Alarm Monitoring Refresh Rate (**AMRR**) can not be Higher than Monitoring Refresh Rate (**MRR**) otherwise the Alarm tracking will be inefficient. **Satevis® device will automatically restrict the value to MRR if user mistakenly send a command with AMRR > MRR.**

| Keep Alive Refresh Rate (KARR) | *Unit: Seconds*

MIN: 20s

MAX: 86400s | Keep alive refresh rate is a notification cycle in Alarm Monitoring mode in the case of no alarm present.

The value should be a multiple of Monitoring cycle.

ⓘ **Satevis® Device will update KARR value to reach a multiple of MRR**

Example: If user enters KARR= 664 seconds and the Monitoring Refresh Rate (MRR) is 60seconds , Satevis® device will adapt KARR to 660 seconds . |

7.3 SET/POST SENSOR CHANNELS ALARM CONFIGS

Command to change Sensors Channels Alarm settings.

| Set Sensor Channels Alarm Configs ▾ | ⓘ | OR ▾ | Low ▾ | | Low ▾ | | Low ▾ | | Low ▾ | | Low ▾ | | Low ▾ | | port 19 | Send | SE |

Field	Unit/Pre-selected settings	Description
Alarm Notification Rule	Pre-selected settings	Alarm notification rule between the sensor channel : • **If OR connection is selected:** if an Alarm occurs on one of the sensor channels (with Alarm notification enabled), a notification is transmitted to the LNS • **If AND connection is selected**: if an Alarm occurs on all of the sensor channels at the same time(with Alarm notification enabled), a notification is transmitted to CommonSense®
High/Low Threshold Alarms	Pre-selected settings	• **Low Alarm Threshold** can be used to trigger an alarm when a data measurement is falling • **High Alarm Threshold** can be used to trigger an alarm when a data measurement is rising • **Mixed High-Low** can be used for sensors used to track a structure/equipment moving to one direction and the opposite • **NO:** means Alarm notification is disabled for the sensor channel
Alarms Thresholds	Values in the unit of sensor channel	**For each sensor channel, Alarms thresholds should be entered as follow:** Minor/Severe Alarm/Critical Alarm **if Low Level Threshold is selected, Alarms Threshold Value are listed as follow:** • Critical Alarm < Severe Alarm < Minor Alarm **if High Level Threshold is selected, , Alarms Threshold Value are listed as follow:**

		• Critical Alarm > Severe Alarm > Minor Alarm **Mixed Alarm Threshold is selected:** |Critical_Alarm| > |Severe_Alarm| > |Minor_Alarm| (Absolute values)

Example: TBD

7.4 SET/POST MONITORING MODE CONFIG

Command to change Monitoring Mode only. This command can be considered as an easy way to START/STOP the Monitoring session.

In the case if user choose Slow Monitoring or Alarm Monitoring, previous Timing settings configured with "SET Monitoring Mode Full config" will be maintained.

Lorawan Port Number	Related Settings	Command Description
19	Pre-selected settings : **Monitoring Mode**	• **STOP Monitoring :** stops site Monitoring, no data measurement is transmitted by Satevis® device • **Slow Monitoring Mode**: • **Alarm Monitoring: Alarms notification is transmitted**

7.5 SET SYSTEM DIAG SETTINGS

Lorawan Port Number	Related Settings	Command Description
19	System Diagnostic Refresh Rate (SDRR)	Command to change Diagnostic refresh rate, user can configure periodicity for receiving Diagnostic Report between 60s and 86400s.

This settings is a multiple of Monitoring Refresh rate. In the case if user doesn't enter right value, it will be automatically adjusted by Satevis® device.

Example: Diag report is transmitted every 300seconds

| Set System Diag Settings ⌄ | ⓘ | 300 | port | 19 | Send |

ⓘ **To increase battery life, we suggest to not use a high periodicity value, you can always transmit a request to get the latest diagnostic report.**

7.6 SET/POST HARDWARE RESET

Lorawan Port Number	Related Settings	Command Description
19	N.A.	Hardware Reset Request

Commands

| Hardware Reset Request ⌄ | ⓘ | port | 19 | Send |

7.7 SET LORA RE-JOIN FREQUENCY CONFIG

Command to change Re-Join frequency in the case of disconnection with the LNS.

Satevis® device initiate a re-join process only in the case in the connection with the LNS is lost.

To not decrease the battery lifetime, Rejoin Frequency can be configured between 1h to 255h.

7.8   SET CLOCK SOURCE CONFIG

Command to change Clock source Config. Currently only LNS Clock source is provided.

Satevis® device is based on LoraWan specifications to sync clock: click here

Clock sync is done 18hours and can be automatically accelerated by the sensor in the case of a clock-drift.

ℹ ***Currently Commonsense® doesn't integrate a command to configure Clock sync refresh cycle.***

7.9   SET DATALOGGER CONFIG

Command to change Datalogger config. This command is still not available.

7.10   SET SENSOR ZEROING CONFIG (ONLY AVAILABLE ON SATEVIS® ALPHA-INC SERIES)

Lorawan Port Number	Related Settings	Command Description
19	Pre-selected setting: Enable/Disable sensor zeroing	Remote sensor Zeroing

Two settings are available:

- **Initiate and Enable :** Enable remotely Sensor zeroing , all the axis X/Y/Z and are set to 0 Degree Angle values

- **Reset Offset and Disable:** Resets sensor zeroing offsets values and disable the operation;

ℹ️ *During sensor zeroing process, the sensor should not be moved otherwise this operation will fail.*

7.11 SET INCLINOMETER SENSOR CONFIG (ONLY AVAILABLE ON SATEVIS® ALPHA-INC SERIES)

Command to configure Inclinometer sensor measuring range:

- **Static Range ±10deg** : measuring range is limited to ±10deg, provides best precision ±0.01°

- **Static range ±85deg**: measuring range is limited to ±85deg, offers higher range with ±0.02° precision

- **Automatic ± 10°:** sensor starts with lower range ± 10° and moves to higher range ± 85°: if the structure is moving with high inclination > ± 10° (Example: vertical/Folding Bridge, Vessel)

- **Automatic range ± 85°:** sensor starts with High Range ± 85° and moves to lower range ± 10° if the structure is moving with low inclination

PORT ID 19

ℹ️ **Automatic Range is adapted for structure transiting between static/dynamic.**
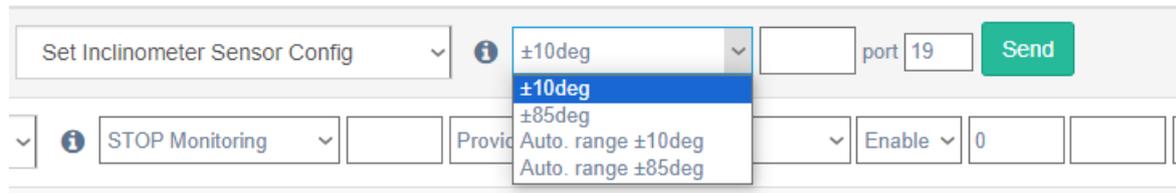
The second field is related to Hysteresis on sensor range update, user can specify the number max of samples before the sensor switch between range on automatic range
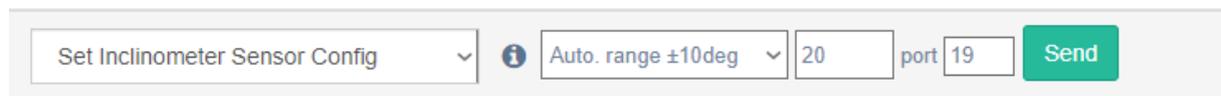
This setting doesn't impact static range ±10deg or ±85deg .

ℹ️ **The sensor Axis pointing to gravity is not taken into account into the calculation between Automatic range ± 85° and Automatic range ± 10° as it's value will be always be higher than 10°.**

7.12   GET DEVICE MAIN PROFILE

Lorawan Port Number	Get Command Description
19	**Get Satevis® sensor Main profile** The main profile is automatically transmitted during device startup. However in the case if it's not received by Commonsense® , user can send a request.

Get Device Main Profile ⌄   ℹ port 19   Send

Your Satevis® device will resend Main Profile message which contains:

- Satevis® sensor Firmware and Hardware version,

- LoraWan® stack information

- Lorawan® region Code,

- Lorawan stack version,

- Info related to Monitoring mode and all timing settings,

- datalogger status.

7.13   GET SENSOR PROFILE INFO

Command to get Satevis® sensor profile . The sensor profile is automatically transmitted during device startup. However in the case if it's not received by Commonsense® , user can send a request to receive it.

Get Sensor Profile Info ⌄   ℹ port 19   Send

Your Satevis® device will resend sensor Profile message which contains :

- Total Number of Active Channels

- Alarms Thresholds values for each sensor channel (Minor/Severe/Critical Alarms)

- High/Low Thresholds Alarms for each sensor channels

- Alarms Notification Rules (AND/OR connection between all sensor channels)

7.14 GET SYSTEM DIAG REPORT

Lorawan Port Number	Get Command Description
19	**Get Satevis® sensor latest Diagnostic Report** Even if diagnostic report can be transmitted on a duty cycle, this command can be used to refresh information in the case if diagnostic report is not transmitted very frequently.

| Get System Diag Report ⌄ | ⓘ port 19 | Send |

7.15 GET HELLO MESSAGE INFO

Command used to Get Hello Message Info,

Hello Message contains:

- **Sensors Channel QuickDiag** : Sensor Working or not Working

- Latest Data measurement for each sensor channel ;

Hello message can also be initiated by field operator on the monitoring site. Please consult Satevis® device User Guide for more information.

| Get Hello Message Info ⌄ | ⓘ port 19 | Send |

7.16 GET LORA STACK INFO

Command used to Get LoraWan Stack Info

| Get LoRa Stack Info ⌄ | ⓘ port 19 | Send |

Satevis® device will respond to this command by sending :

- LoraWan MiddleWare/Physical Layer Versions

7.17   GET MONITORING FULL CONFIG

Command used to Get Monitoring Full config

PORT 19

Satevis® device will respond to this command by sending:

- **Monitoring Mode**: Slow Monitoring/Alarm Monitoring/Stop Monitoring

- **All the Timing Values related to Monitoring Mode**: Monitoring Refresh Rate , Alarm Monitoring Refresh Rate, Keep Alive Monitoring Refresh Rate

- **Momentary Data backup:** Enabled/Disabled

7.18   GET SENSOR CHANNELS ALARM CONFIG

Command used to Get sensor channels alarm config

The following Information are transmitted by Satevis® device:

- Alarm OR/AND rule

- Alarm enabled/disabled for each sensor channel

- Alarm Thresholds Crossing : Low/High/Mixed for each sensor channel

- Alarmn thresholds : Minor/Severe/Critical for each sensor channel

7.19 GET MONITORING MODE CONFIG

Get Command for Monitoring Mode config

PORT 19
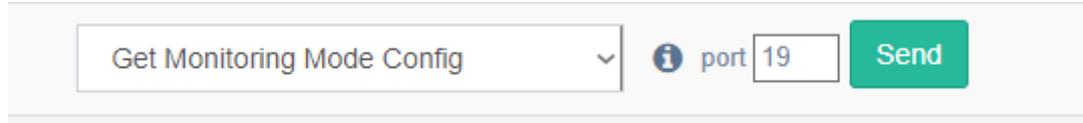
Satevis® device will respond to this command by sending the current Monitoring Mode used on the sensor.

7.20 GET SYSTEM DIAG SETTINGS

Get Command for System Diag Settings.

PORT 19
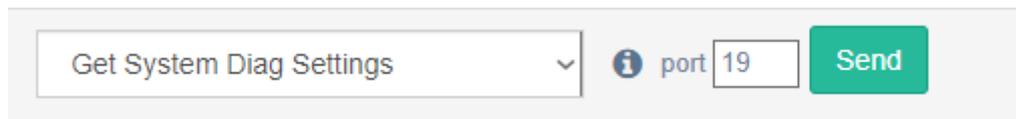
Satevis® device will respond to this command by sending **System Diagnostic Refresh rate (SDRR)**

7.21 GET LORA REJOIN FREQUENCY CONFIG

This info is already transmitted in the Main Profile during Satevis® sensor startup, but user can send a Get command for updating LoraWan® Rejoin Frequency status in the case if the Main profile is not received.

PORT 19

The rejoin frequency (unit: h) is displayed on your Satevis® sensor Dashboard.

7.22 GET CLOCK SOURCE CONFIG

Get command for Clock source Config (currently only Lorawan clock source is available)

7.23   GET SENSOR CALIBRATION CONFIG

Get command for Sensor Calibration settings

PORT ID 19

Satevis® sensor will respond to this command by sending for each sensor channel:

- Sensor Calibrated/Uncalibrated

- Calibration date

These information are available on Satevis® sensor Dashboard.

7.24   GET SENSOR ZEROING CONFIG (INCLINOMETER SENSOR ONLY)

Get sensor zeroing config status

PORT ID 19

Satevis® sensor will respond to this command by sending:

- Sensor zeroing: Enabled or Disabled

7.25   GET SENSOR ZEROING RESULTS (INCLINOMETER SENSOR ONLY)

Get the offset corrections values on X/Y/Z axis of inclinometer sensor after a Sensor Zeroing.

PORT ID 19

Satevis® sensor will respond to this command by sending:

- Offset values on X/Y/Z Axis of inclinometer after sensor zeroing process

- Date related to Sensor Zeroing

7.26 GET INCLINOMETER SENSOR CONFIG

This info is not transmitted during the Satevis® sensor startup , user need to send a GET command to refresh it on Satevis® sensor Dashboard.

PORT ID 19

Satevis® sensor will respond to this command by sending:

- Inclinometer sensor measuring range : **Static Range ±10deg / Static range ±85deg / Automatic ± 10°/ Automatic range ± 85°**

- **Hysteresis value**

8   DATA VIZUALIZATION AND DATA EXPORT

Both Graph Display and data export are available on Data Visualization Field.

Click on Device => Data

Displays all the Measurement data on graphs
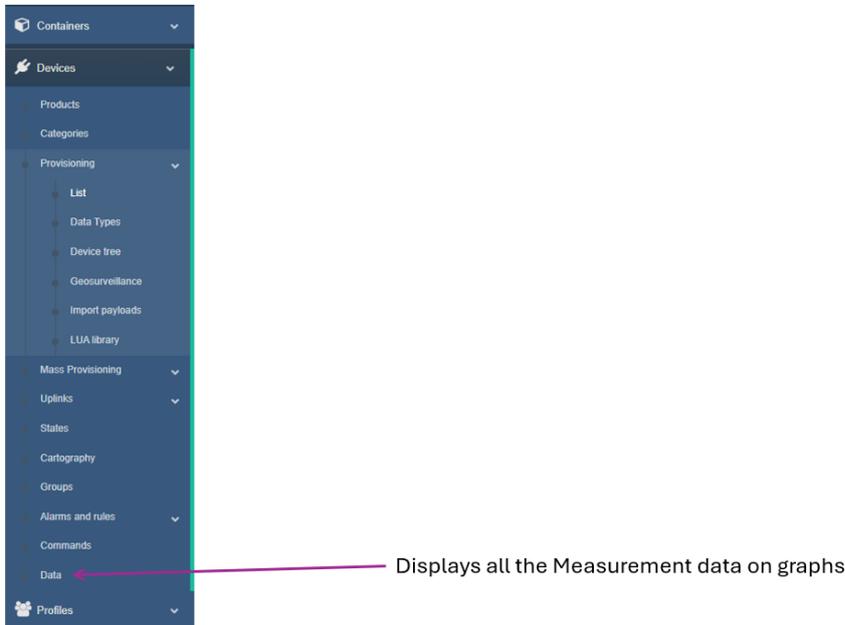
Then select your Device from the device list
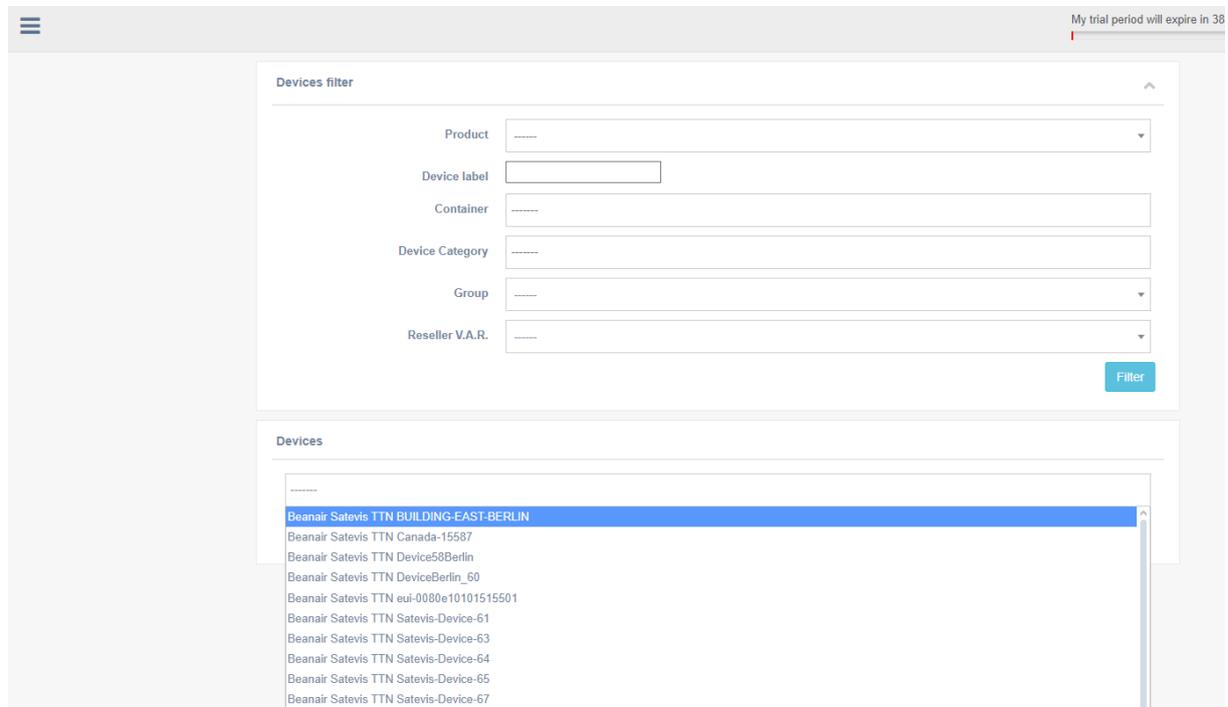
Click on Datalog

Devices

× Beanair Satevis TTN BUILDING-EAST-BERLIN

Select all Devices | Geoloc | DataLog

Then select data measurement to display

Datalog filter

Datalog | |------

BUILDING-EAST-BERLIN: Temperature
BUILDING-EAST-BERLIN: Humidity
BUILDING-EAST-BERLIN: SNR
BUILDING-EAST-BERLIN: RSSI
Datalog limit | BUILDING-EAST-BERLIN: Internal Temperature
BUILDING-EAST-BERLIN: Battery
BUILDING-EAST-BERLIN: Inclination X
Start date | BUILDING-EAST-BERLIN: Inclination Y
BUILDING-EAST-BERLIN: Inclination Z
End date | BUILDING-EAST-BERLIN: Percentage 1
BUILDING-EAST-BERLIN: Acknowledgment

Select : Start Date and End Date and Datalog limit

Datalog limit | 1000
If too much Data is retrieved, an error may occur. Limit the number of Datalogs to export to avoid this problem.

Start date | 13/06/2024

End date | 23/06/2024

Graph

CSV - Data

CSV export

Click on Graph To display real-time graph

Click on CSV Export to export data in CSV Format

You can also export Attributes History with Data Measurement:

CSV - Data

CSV - Data
CSV - Data + Attributes history
CSV - Attribute history

8.1   NETWORK QUALITY (SNR &RSSI)

From practical experiments:

- **If SNR approaches the limit specified for the spreading factor then the packet reception will start to fail. For SF8, the SNR limit is -10dBm. SNR a very good indication of approaching reception failure.**

- **Under very good reception conditions, with strong signals, SNR is not a good indicator of signal quality and RSSI should be considered;**

Both SNR and RSSI are provided by your LoraWan® Gateway to your LNS.

A RSSI is >-114 and SNR >-8, it can still be considered as acceptable.

Select:

- Internal SNR and RSSI Datalogs ,

- Start Date and End Date

- Datalog Limit

Then click on Graph

8.2   BATTERY VOLTAGE AND INTERNAL TEMPERATURE

Internal Temperature is displayed in °C, Battery Voltage is displayed in Volts

Select:

- **Internal Temperature** and **Battery** Datalogs ,

- Start Date and End Date

- Datalog Limit

Then click on **Graph**

8.3   INCLINOMETER DATA MEASUREMENT

TBD

8.4 EXTERNAL TEMPERATURE AND HUMIDITY DATA MEASUREMENT

In the case if you are using External Temperature and Humidity Sensor, select

- **Internal Temperature** and **Battery** Datalogs ,

- Start Date and End Date

- Datalog Limit

Then click on **Graph**

8.5 ATTRIBUTES HISTORY

TBD