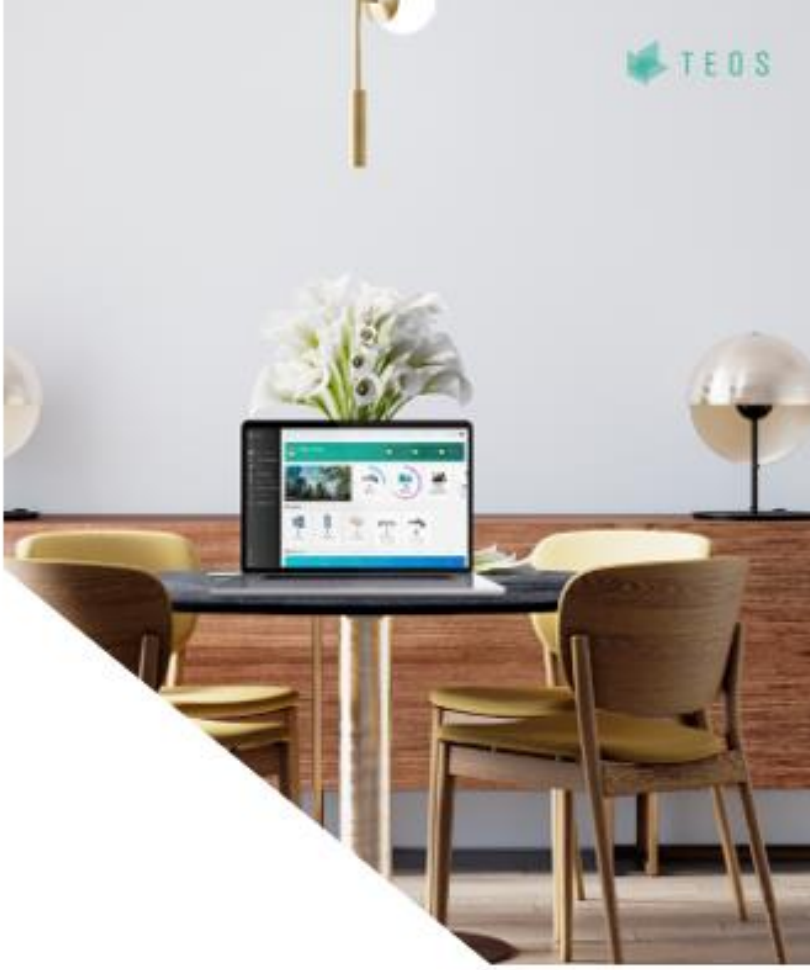
SONY



Professional Sensors

TEOS Installation & User Manual

Document revision 1.4

Overview

Thank you for purchasing these products. These Sensors are designed for professional use. They have professional functions such as desk presence detection, Meeting room Presence, temperature and humidity, for comfort (on common areas or meeting rooms, a comfort sensor with CO2, temperature and humidity. Using ultra low energy consumption technology LoRaWAN, you will be able to use those sensors in full autonomy without any additional cable. A LoRaWAN gateway will do the bridge to TheThings platform, which is connected with TEOS Furthermore, by using optional software, you can add additional convenient features. Before operating the sensors, please read this manual thoroughly.

SONY

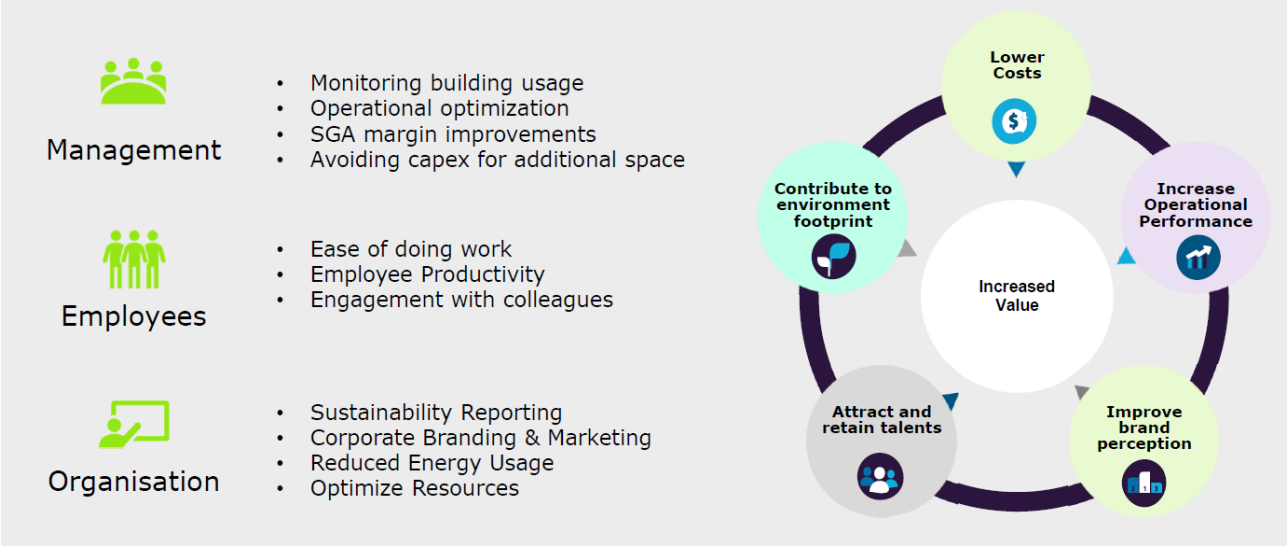
Requirements

- **LoRaWAN Gateway (not supplied),** the requirement for a gateway for EU region usage a frequency compatibility from 863-870 MHz with 8 channels at least
- LoRaWAN Gateways used for tests:
  - You can find all the LoRaWAN gateways compatible in this URL under thethingsindustries website
  - Multitech Conduit AP (https://www.multitech.com/brands/multiconnect-conduit-ap)
  - Seeed Studio The Things Indoor (for demo purpose found in Amazon HERE.
- **The Gateway MTCAP-868-001A for the version with power supply and MTCAP2-868-002A-POE for the POE version are proposes by Alcom which are working on deployed installations.**
- Manage for TEOS from version 3.0
- TEM-SL20.xY, package with 20 device licenses to be able to add them into TEOS, get the data and take actions from this data
- Internet access for TEOS, to be able to connect with TheThings Platform
- **When you receive sensors, you will need the AppKey in line with the devEUI sensors you have. Please send an email to support@teos.support to get the Appkeys based on your devEUI list**

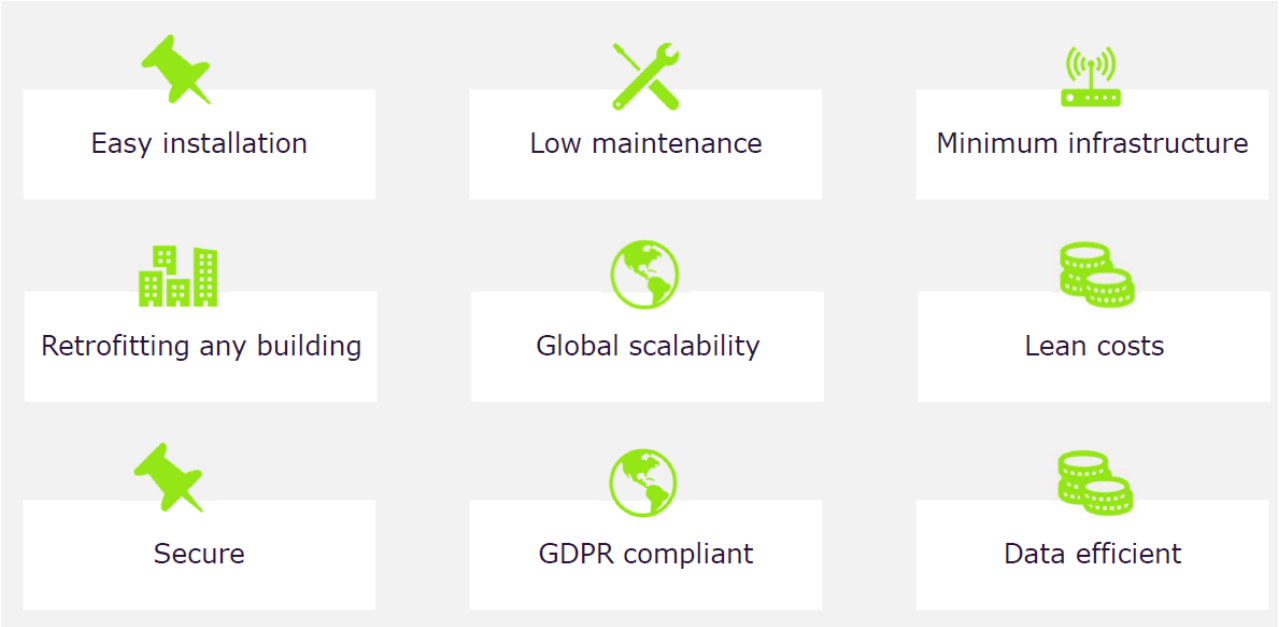
Contents

1. Sensors for TEOS description

Smart Building solutions increases the value of an organisation for various stakeholders. Therefore, it is important that the desired and final solution meets the exact needs of a business



The sensor for TEOS is a battery-powered device designed to be intelligent, accurate, long-lasting and easily deployable using LoRaWAN wireless network technology. It is explicitly developed to intelligently create sensor readings on e.g. presence, indoor climate conditions and CO_2 by using an intelligent embedded algorithm.



Sensors are designed around high-quality hardware. Its smart software design and embedded intelligent algorithms allow you to operate the sensor network at a low cost, providing *accurate* and *relevant* data when needed.

1.1 Comfort Sensor (OFFICESENSE2COMF)

The Comfort sensor is an intelligent sensor device to measure comfort levels of conference rooms and other office spaces.
The Comfort sensor consists of sensor components within one device that can measure:

1. CO_2 or VOC*
2. Temperature
3. Humidity
4. Sound*
5. Light*

* H2/2020 sensor version onwards

The internal calibration of the Comfort sensor sets 400 ppm (by default) to the lowest registered value in the last 7 days (by default). This means that the sensor must be exposed to well ventilated areas at least once during this period to provide accurate measurements. The Comfort sensor has been calibrated in factory but will initiate a calibration cycle on first power-up.

Sensor readings are based on configured delta measurements. If a new measurement is within this delta, this new reading is not sent as a new measurement. The wider this delta is chosen, the less readings are received conserving battery power, bandwidth and storage requirements. The philosophy is simply that new data doesn't always deliver new information.

A comfort sensor is sending information when there is a change or at least twice a day to update data.

1.2 Presence Sensor (OFFICESENSE2PRES)

The Presence sensor is an intelligent sensor device to detect occupancy of conference rooms and other office spaces.
Presence sensor consists of sensor components within one device that can measure:

1. Occupancy
2. Temperature
3. Humidity

The built-in intelligence prevents false-positive errors enabling very precise occupancy information sensing, thus resulting in more accurate information on (room) occupancy.

When there is no presence, the presence sensor will take less than 1 minute to change the status and move to 1 (when there is presence). A presence sensor is setup to 5 minutes checking if there is no presence. After 5 minutes when no presence is detected it changes to 0 and send the event. Sensor data is sent to LoRa WAN by default on the event way.

1.3 Desk Sensor (DESKSENSE)

The Desk sensor is an intelligent sensor device to detect occupancy of individual desks. The smooth streamlined surface design prevents users from (painfully) bumping against the sensor and knocking it off during usage.

When there is no presence, the desk sensor will take around 2 minute to change the status and move to 1 when there is a presence. A desk sensor is setup to report after 30 minutes checking if there is no presence by default. After 30 minutes when no presence it changes to 0 and send the event. Sensor data is sent to LoRa WAN by default on the event way.

1.4 SENSORS MATRIX

TEOS Sensor

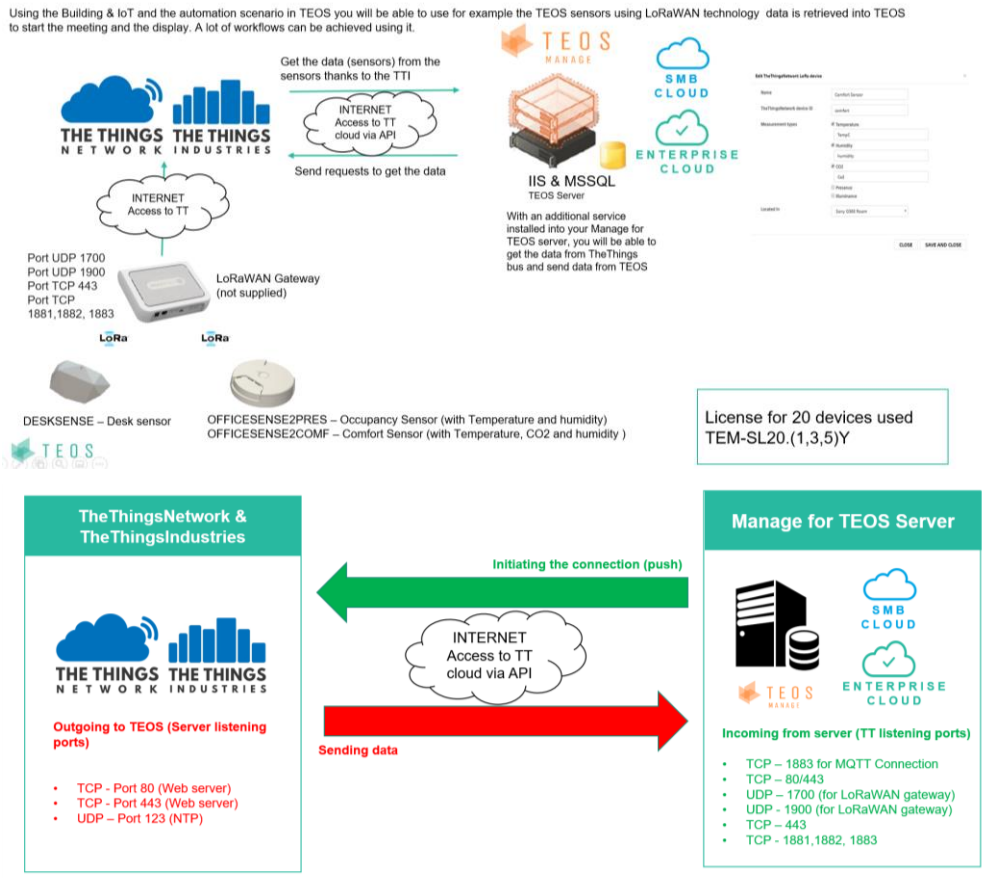
		Desksense (P190201) (Desk sensor)	Officesense2Pres (P191110) (occupancy sensor)	Officesense2Comf (P191112) (comfort sensor)
	Functionality	Desk presence detection	Presence, temperature and humidity	Co2, temperature, humidity, sound, light
Communication	**Data communication**	LoRaWAN Class A	LoRaWAN Class A	LoRaWAN Class A
	Connection	LoRa Gateway (not supplied by Sony) and TTN or TTI	LoRa Gateway (not supplied by Sony) and TTN or TTI	LoRa Gateway (not supplied by Sony) and TTN or TTI
	Integration with TEOS Manage	Yes (using TheThingsNetwork, TTN)	Yes (using TheThingsNetwork, TTN)	Yes (using TheThingsNetwork, TTN)
	Compatible license in TEOS Manage (not included)	TEM-SL1Y/3Y/5Y	TEM-SL1Y/3Y/5Y	TEM-SL1Y/3Y/5Y
Presence sensor	**Presence detection**	Device's intelligent software determines desk occupancy based on PIR sensor data	Device's intelligent software determines desk occupancy based on PIR sensor data	-
Temperature sensor	**Temperature output range**	-	[-40 ˚C to +80 ˚C], in ˚C or F	[-40 ˚C to +80 ˚C], in ˚C or F
	Temperature resolution	-	0.01°C	0.01°C
	Temperature accuracy	-	±0.4°C (typical)	±0.4°C (typical)
Humidity sensor	**Relative humidity mesurement range**	-	0-100%	0-100%
	Relative humidity resolution	-	0.1%	0.1%
	Relative humidity accuracy	-	±2% (typical)	±2% (typical)
Co2 sensor	**Co2 mesurement range**	-	-	0-5000 ppm
	Co2 resolution	-	-	1 ppm
	Co2 measurement accuracy	-	-	+/-(45ppm+3% of reading)
Sound Sensor	**Sound range**	-	-	35-99 dB
	Sound resolution	-	-	1 dB
	Sound accuracy	-	-	±5 dB
Light sensor	**Light range**	-	-	4 - 4000 LUX
	Light resolution	-	-	1 LUX
	Light accuracy	-	-	± 10 LUX
Power requirement	**Power supply**	2 Standard AA batteries (Not supplied) (preferably long lifespan)	2 or 4 Standard AA batteries (Not supplied) (preferably long lifespan)	4 Standard AA batteries (Not supplied) (preferably long lifespan)
	Battery life-span	Arround 5 years* (Based on standard factory settings)	Arround 10 years* (Based on standard factory settings)	Arround 12 months * (Based on standard factory settings)
	Operating voltage	1.2-3V (10 uA in deep sleep)	1.2-3V (10 uA in deep sleep)	supplied 4 batteries)
	Frequency plan	EU868, US915, IN865 (AU915, AS925)**	EU868, US915, IN865 (AU915, AS925)**	EU868, US915, IN865 (AU915, AS925) **
Dimension and Weight	**Dimensions**	137 x 75 x 27mm	115x115x40mm	115x115x40mm
	Weight	0.14 Kg (including batteries)	0.27 Kg (including batteries)	0.27 Kg (including batteries)
	Attachment	Double-sided tape	Clip or double-sided tape	Clip or double-sided tape
	Processor	STM32L0, ARM Cortex-M0+	STM32L0, ARM Cortex-M0+	STM32L0, ARM Cortex-M0+
	Recommended installation location	Indoor under the desk	Indoor on the ceiling in Meeting Rooms	Indoor on the ceiling (Open spaces and meeting rooms)
	Detection Area	35-55 cm from the edge of the table 0.8m high x 0.8m width x 0.66m depth	44° @2.2m High and R= 2.2m	
Package content	**Included in the package**	1x Sensor without battery and double side tape	1x Sensor without battery and double side tape	1x Sensor without battery and double side tape
Warranty	**Standard Warranty**	**3 years with advanced exchange**	**3 years with advanced exchange**	**3 years with advanced exchange**

*** Battery life indicated above is a theoretical value and has been verified by a fast aging procedure. However, battery life is dependent on factors such as battery quality, moisture, temperature, etc.**

**** The band used depends on deployment region, contact us for more information)**

1.5 TECHNICAL FLOW OVERVIEW

To use the sensors into TEOS, or in another platform you need to understand the network infrastructure needed for that part.

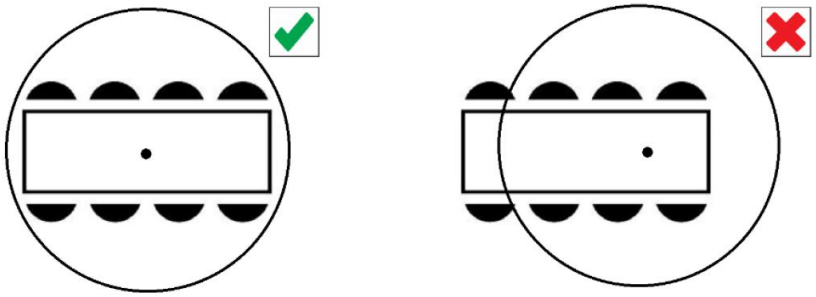


2. First installation of a sensor

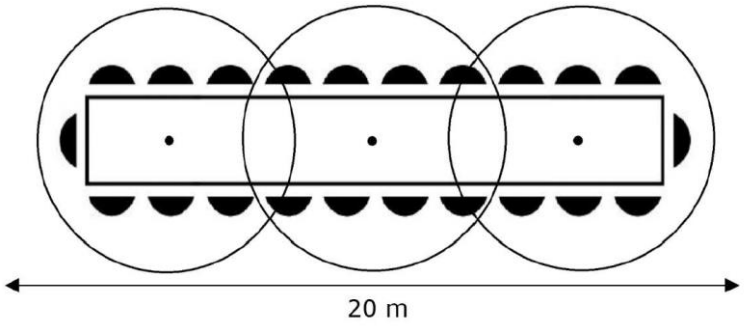
This section will give more details on how to install sensors for TEOS

2.1 SENSOR PLACEMENT RECOMMENDATIONS

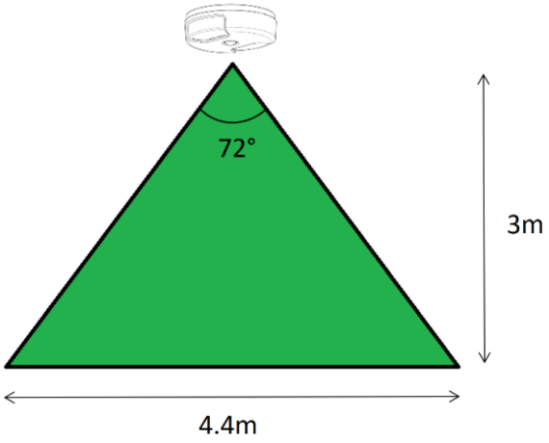
The sensor needs to be placed right above the working area for the detection of the people working there. Especially in the smaller rooms, it suffices to place the sensor in the middle of the ceiling, right above the desk to detect everyone sitting at the desk.



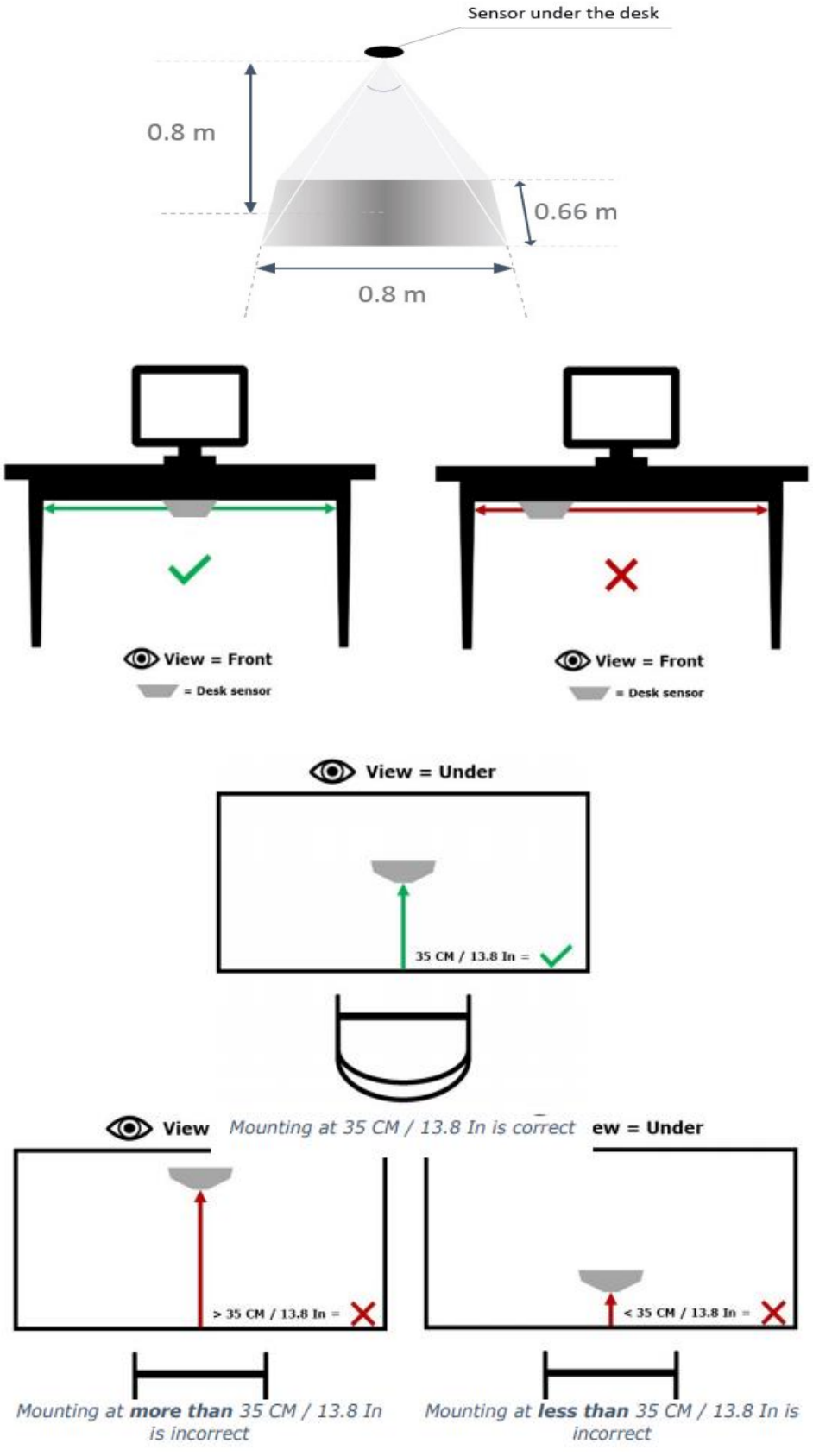
For larger rooms, it is recommended to use multiple sensors and spread them evenly across the seating area, like the figure below. It is recommended to slightly overlap the detection planes of the sensors for better detection results.



The figure below shows the detection fields of the sensor. The recommended maximum height of the ceiling is 3m.

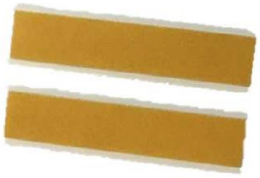


The passive infrared (PIR) sensor on the desk sensor component only acts on motion sensing and does not recognize any person specifically nor register personal data. Detection area is:



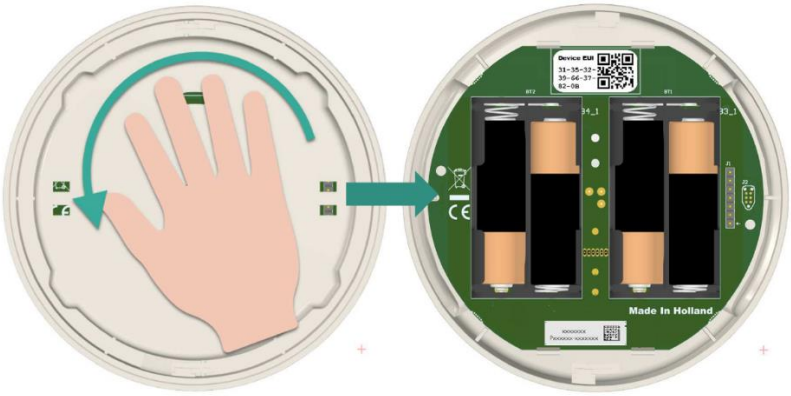
2.2 INSTALLATION DETAILS

Before starting the deployment of the sensors make sure the LoRa network is in place and connected and you have the device EUI (DevEUI), AppKey and App EUI. This informations will be explained later in this document. **Checking the contents of the shipment**
You have received a set of sensors in a box. The box contains the following:

Contents of the box			
Sensors (with batteries inside)	Strips of double-sided tape	-Or-	Ceiling clips
			

The sensors that are shipped are based on your country. Please check if the label on the box matches your country

Opening and activating the sensor
The sensors come pre-equipped with batteries. To activate the sensor, you need to remove the plastic pull tab to enable power to the device. To get access to the batteries, you need to open the sensor casing. You can open the sensor casing by rotating the base-plate anti-clockwise.



This will give you access to the battery pull-tab and the QR code for registering the sensor to the room. After you pull the tab make sure the batteries are properly inserted into the device.

Mounting the sensor on the ceiling

There are two options to mount the sensor to the ceiling of the room. Provided in the shipping box are either strips of double-sided tape or special ceiling clips which can be used to mount the sensor.

Deploying sensors using the ceiling clip (not always provided)

Note: the ceiling clip can be used with suspended ceiling constructions with metal strips of up to 2.5cm.

1. Open the sensor by removing the baseplate.
2. Attach the ceiling clip to the ceiling.
3. Attach the sensor baseplate on the clip (you will hear a click!).
4. Scan QR code of the sensor and remove the battery-pull-tab to activate it.
5. Attach the sensor to the baseplate by turning it clockwise on the baseplate.

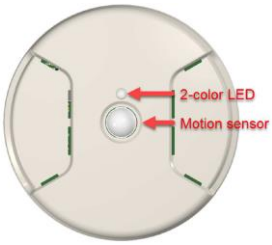
Deploying sensors using the double-sided tape

1. Open the sensor by removing the baseplate.
2. Stick the tape to the baseplate of the sensor, as shown below.
3. Clean the ceiling surface from dust, dirt and grease.
4. Make sure the target surface is flat and dry (no relief surface).
5. Stick the baseplate to the ceiling surface with the tape, press firmly.
6. Save the DevEUI in an Excel with the room name, remove the battery-pull to activate it.
7. Attach the sensor to the baseplate by turning it clockwise on the baseplate.

2.3 SENSOR OPERATION

The table below describes the different modes of operation and the means of identifying them. The sensor has a 2-color LED (green and red) that is used for indication.

Note: Not all operational modes can be identified by the user using the LED.



Status red- LED	Status green-LED	Description	Sensor status
Off	On	The state after activating the sensor by placing batteries or removing the battery-pull-tab.	Start-up
Off	Blinks every 500ms	The sensor has not joined a network.	Joining network
Off	Blinks	Normal operation mode. Sensor is activated by motion and determines the room occupancy using a custom algorithm.	Occupancy detection
Off	Off	When no motion is detected, and the sensor is not running the occupancy detection algorithm or collecting sensor data. The sensor is in sleep mode to preserve power.	Sleep
Blinks	Off	An error has occurred.	Error
On	Off	The battery level is low and the battery should be replaced.	Empty Battery

In order to register and use the sensor on the network, make sure you have the provided sensor unit credentials at hand. The sensor unit must be registered on your LoRaWAN network before it can send out sensor measurement data. The sensor unit credentials consist of the Device EUI (DevEUI), an application EUI (AppEUI) and a unique application key (AppKey).

These sensor unit credentials are delivered with the sensor unit. Please make sure these credentials are kept in a safe place.

After successful registration of a sensor unit, it will try to join the network by means of Over the Air Activation (OTAA). Once the sensor has joined the network it will start its sensor measurements and send out data packets.

APPEUI (70-B3-D5-FF-FE-0B-50-05)

The standard AppEUI is included in the firmware. This is to have a fallback when the connection to a device is lost. The device regularly checks whether there is still a connection to the LoRa server and performs a join request again if this is not the case. If the custom LoRa credentials do not work here, the device falls back to the default values after a couple of attempts so that you can re-provision your device there. If the registration in the server becomes corrupt, the device will ultimately be accessible via the defaults and it can be re-provisioned.

DEVEUI (XX-XX-XX-XX-XX-XX-XX-XX)

Every Sensor include his own DevEUI. This information corresponds to the unique address of the device (like a Mac address). This device EUI has a mix 16 numbers/letters. This information will be used to register the device into TheThingsNetwork, TheThingsIndustries or other platforms

APPKEY (32 VALUES)

Every Sensor include his own AppKey. This information corresponds to the unique password of the device (in order to get the data from the device). This key has a mix 32 numbers/letters. This information will be used to register the device into TheThingsNetwork, TheThingsIndustries or other platforms

2.4 SENSORS MESSAGE PAYLOADS

Once connected to the LoRa network, the sensor device will start sending messages to the backend. LoRaWAN message payloads are designed to be small and lightweight and therefore only contain byte sized hexadecimal values (eg. ‘0x53’ is the hexadecimal equivalent of the decimal number ‘83’ or the ASCII character ‘S’). The following image represents a possible LoRaWAN message received from an OfficeSense device.

0x[46 01 30 08 7D 44 04 45 04 31 1B C8 32 2C **]**

The sensors devices have many ways in which they can be configured and therefore have many different parameters or sensor values that will be communicated. This means that there are many ways the LoRaWAN message payload can be constructed.

It is important to understand that the order in which data is sent is arbitrary and certain parameters are not necessarily placed in the same position in the message payload every time the message is sent (so the first value might not contain the same parameter in 2 separate messages). Also, different parameters can have different value ranges. Which in turn determine how many bytes are needed in the message to convey the data (temperature data is stored in 2 bytes whereas humidity only needs 1 byte). Therefore, the message payload cannot be divided into equal sized parts expecting each part to contain relevant data. Lastly, to properly interpret the message a parameter value is

always preceded by its parameter id. Not only does the id identify what value comes next, but also how many bytes belong to this parameter.

So, to summarize:

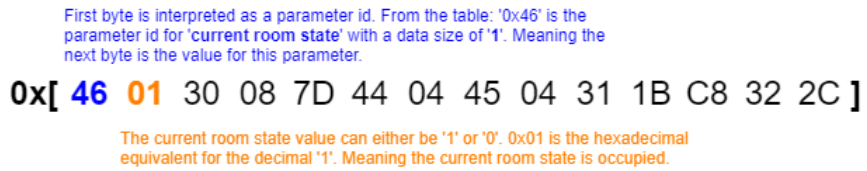
In a message received from the OfficeSense device:

- The position of a parameter in the message payload is arbitrary and can change between messages.
- The size of the parameters' data can differ from one another, meaning more bytes can belong to one parameter than the other.
- A parameter value is always preceded by its parameter id, denoting what parameter comes next and how many of the following bytes are part of its value.

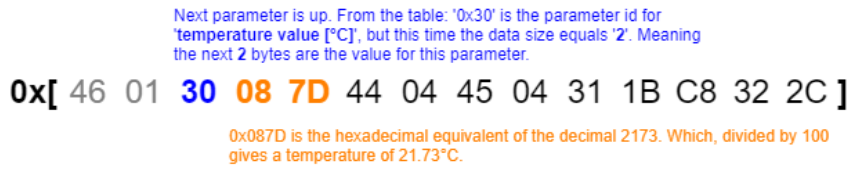
2.5 Decoding an Sensor message

As previously stated, the message payload consists of one or more parameter identifiers along with its current value. All the parameter ids are listed in the table on page 5. It also lists how many bytes following this id should be interpreted as part of the parameter value.

Based on this information, the example payload above can now be decoded.



The first byte in the message is always interpreted as a parameter id (as the parameter value must be preceded by an id, so the id always comes first!). In this case it is the parameter id for the current room (or desk) state with a data size of 1 byte. Meaning the one byte after the id is part of the parameter value. A hexadecimal 0x01 is a decimal 1 meaning the room is currently occupied. And with that, the first parameter is successfully decoded, and a new parameter is up next.



Next byte in the sequence is another parameter id (since we just finished with the first parameter) and this time it is the parameter id for the temperature value[°C]. This value is sent multiplied by 100 to accommodate the decimal accuracy and therefore need to be divided by 100 again to get the actual temperature reading.

Continuing this process, the whole payload can be decoded. To decode the given payload:

- Current roomstate (0x46) is occupied (0x01 = 1)
- Current temperature[°C] (0x30) is 21.73°C (0x087D = 2173, divide by 100)
- # samples taken in false positive routine (0x44) = 4 (0x04 = 4)
- # samples that detected motion (0x45) = 4 (0x04 = 4)
- Current temperature [°F] (0x31) is 71.12°F (0x1BC8 = 7112, divide by 100)
- Current relative humidity (0x32) is 44% (0x2C = 44)

Modifying sensor behaviour

Every sensor unit is shipped with a predefined set of parameters. These parameters can be modified to the use of your application or to your personal preferences. When changed the new parameter settings are sent by means of Over the Air (OTA) functionality. The list of parameters that can be modified are in below table. A modification of settings can only occur after the sensor has initiated and sent a data packet to the backend. In return the network can sent back any change in parameter settings to update the sensor unit according to your preferences. This behaviour is by design, as only the sensor can initiate communications first. The table gives an overview of the parameter settings that can be read and/or changed, including their defaults.

Parameter	ID	Data size (B)	Factory default	R/W	Description
Device specific					
Build Number	0x01	7		R	Timestamp when firmware was built (YYYY MM DD HH MM SS)
HW Version	0x02	1		R	Hardware PCB version
SW Version	0x03	2		R	Software production version [primary v, secondary v]
Heartbeat					
HeartBeatInterval	0x10	2	720	R/W	Interval in minutes at which the heartbeat message is triggered (up to 12 hrs)
LoRa Rejoin msg counter	0x12	1	20	R/W	Perform LoRa join request when uplinkcounter exceeds this number (x100)
General data					
deviceFunction	0x20	1		R	Determines which application is run
Battery level	0x22	2		R	In milliVolts [mV]
RTC time	0x23	3		R/W	Current RTC time (hh:mm:ss)
Sensor Data					
Temperature (deg C)	0x30	2		R	Temperature value(in deg. C x 100)
Temperature (deg F)	0x31	2		R	Temperature value(in deg. F x 100)
Humidity	0x32	1		R	Humidity value(in %)
CO2	0x33	2		R	Carbon Dioxide Value in ppm
Application: Occupancy / Desk					
nSamplesNeeded	0x40	1	6	R/W	Number of samples taken during entire false positive routine
t_Sample	0x41	2	1	R/W	Time in seconds between samples during false positive routine
t_Stopped	0x42	2	$180^{(Presence)}$ $900^{(Desk)}$	R/W	Time in seconds the sensor is in stop mode after room/desk is deemed occupied. (Minimum message interval is t_Stopped + t_Idle)
t_Idle	0x43	2	$120^{(Presence)}$ $900^{(Desk)}$	R/W	Time in seconds the sensor is in idle mode after stop mode has passed. (Minimum message interval is t_Stopped + t_Idle)
nSamplesTaken	0x44	1		R	Number of samples already taken during the false positive routine
nSamplesPositive	0x45	1		R	Number of samples that detected motion during the false positive routine
Current room/desk state	0x46	1		R	Boolean: 1 = true (occupied) or = false (empty)
LoRa Credentials					
Custom AppEUI	0x50	8		W	
Custom AppKey	0x51	16		W	
Application: Comfort					
sensor config	0x60	1	0xE0	R/W	Determines which sensors are used in the comfort application
t_Sample	0x61	2	600	R/W	Sample time (MCU wakes up every x seconds)

Parameter	ID	Data size (B)	Factory default	R/W	Description
Temperature sensor	0x62	4	500, 3600	R/W	Temperature deltaValue [in 0.01deg C] and minimum update interval [t in s]
Humidity sensor	0x63	4	3, 3600	R/W	Humidity deltaValue [in %] and minimum time interval [t in s]
CO2 sensor	0x64	4	100, 3600	R/W	CO2 deltaValue [in ppm] and minimum time interval [t in s]
CO2 calibration counter	0x66	1		R	Counter which is decremented every CO2 measurement. Sensor will calibrate when 0 is reached
Commands					
Reboot	0xE0			W	Trigger a reboot of the device
Reset to factory defaults	0xE1			W	Resets config parameters to factory defaults and reboots the device

Important: the sensor unit will only accept parameter change requests on LoRa Port 100. Current parameter settings can be requested with the corresponding ID on LoRa port 200 and will be answered with the next message.

Payload decode example

For your application to use the sensor data the sensor data payload must be decoded into a format that can be read by your application.

Below, you will find an example which shows a routine to decode or parse the sensor data payload into JSON. The intergration in TheThingsNetwork and in TEOS is explained below.

3. Add LoRaWAN controller and Sensor into TEOS

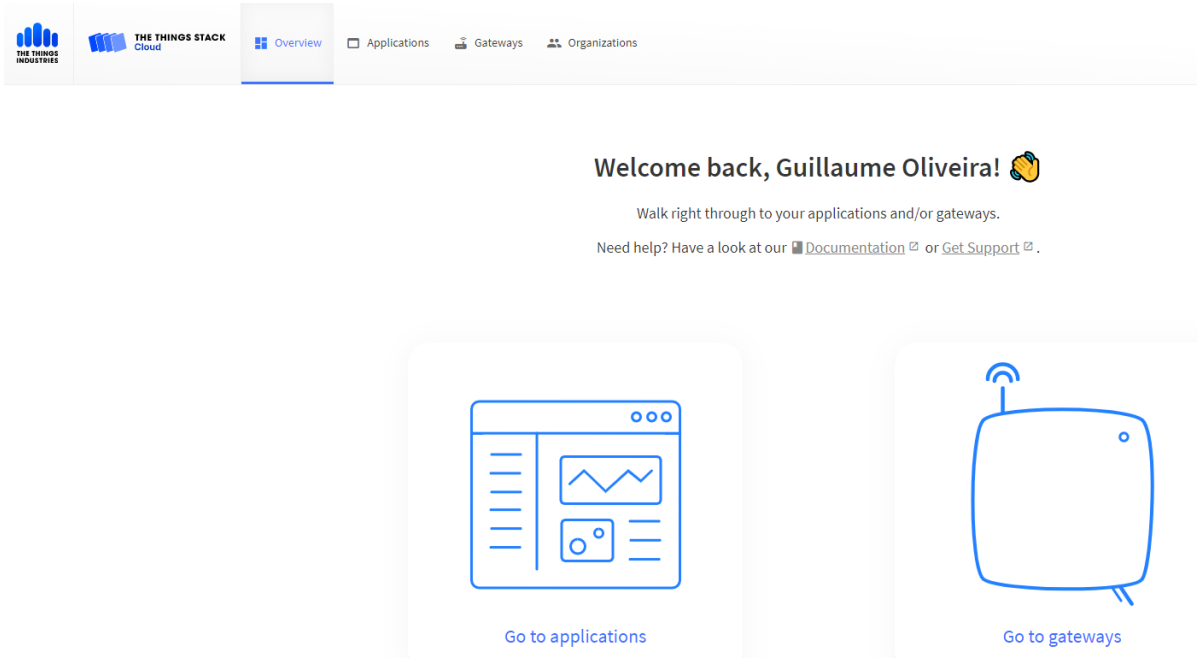
For LoRaWAN TEOS Sensors integration and taking the example of the Multitech gateway and TheThingsNetwork integration, please make sure, TTN platform can receive the data from the devices, which means that you have a gateway and an application created.

Be aware that from December 2021, the V2 Console will be shut down and thethingsnetwork will be only V3. We recommend you to use directly the V3 platform or to use our Sony thethingsindustry platform (please contact us for that part)

3.1 Gateway Creation in TheThingsNetwork (optional)

For you to see if you gateway can connect to ThethingsNetwork and get information from it.

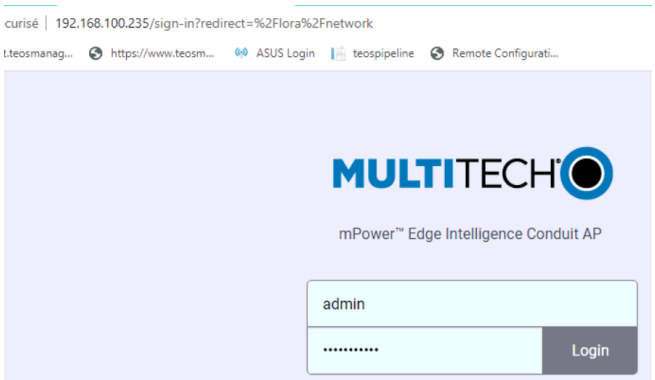
Go to https://console.thethingsnetwork.org and create an account, when you have access to the console, select gateways to create the link between the gateway and TTN.



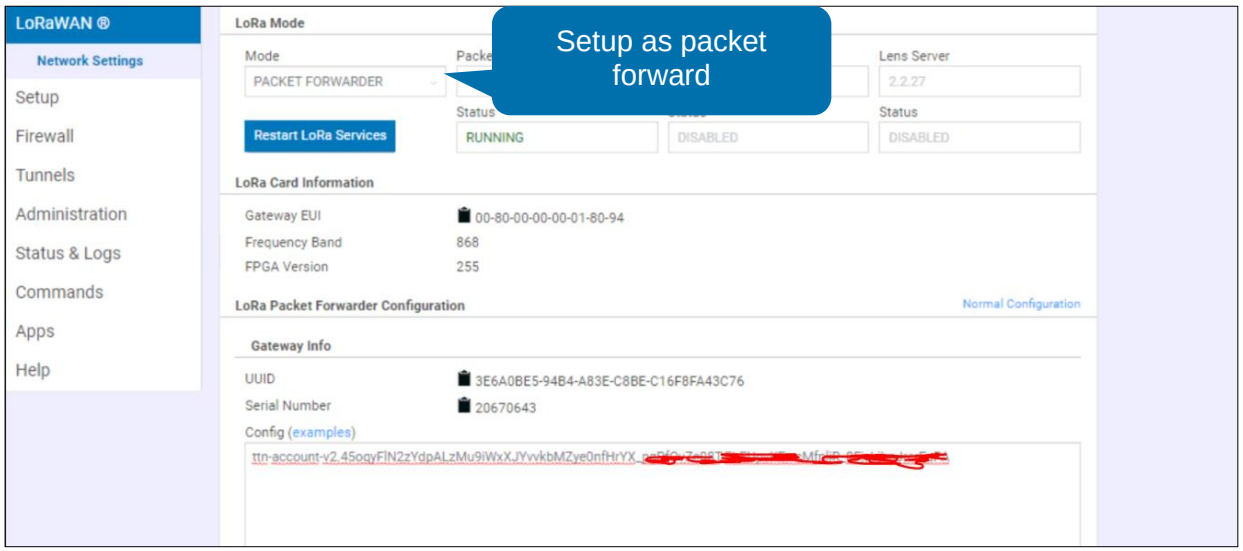
3.2 Configuration of the LoRa Gateway

Using the Multitech Conduit AP, connect the device to a network where you can access on and the gateway get an internet access.

Open the web browser of the gateway (please follow the steps defined by the vendor for the first usage of the gateway) and login.

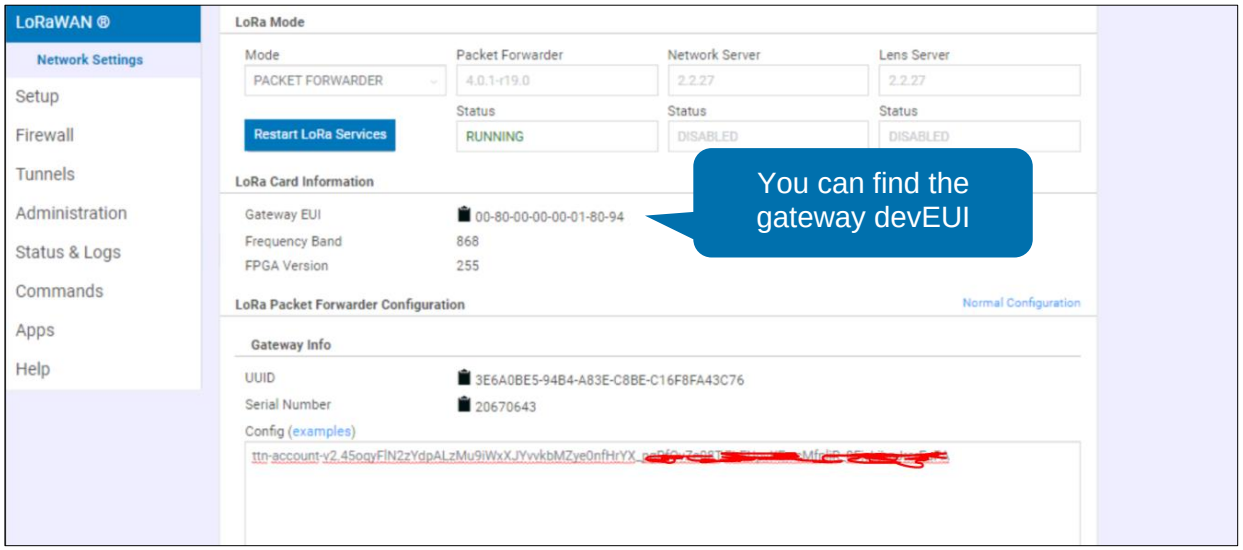


Go to LoRaWAN page and select Network Settings. **For the gateway setup the gateway in packet forwarded. By default, the gateway will forward the packet to the public thethingsNetwork.**

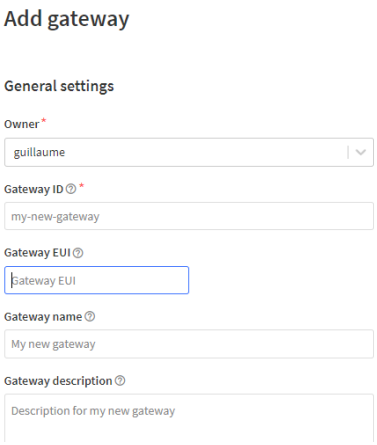


Save your configuration and restart LoRa Services, the gateway should show the status “RUNNING”

If you want to see the gateway status under thhethingsnetwork (**can be done at the end**), take the Gateway EUI here to report under TTH in the gateway section



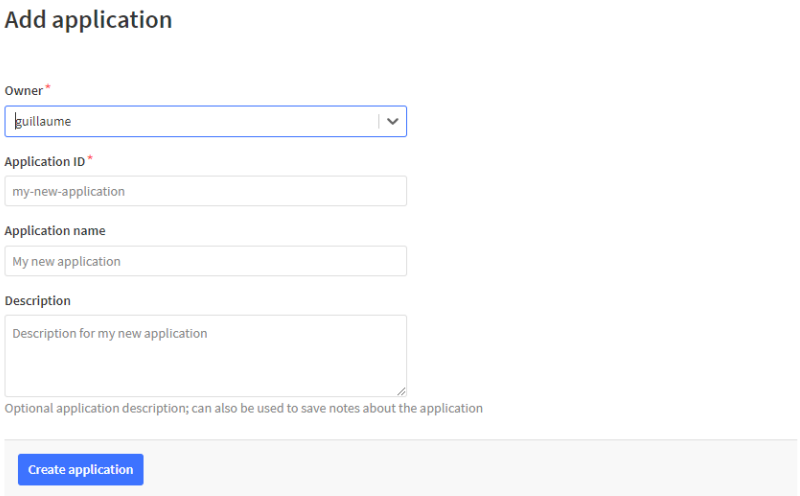
Insert a gateway ID with the gateway EUI (shown below), define the Frequency Plan (868MHz) if you are in Europe and select the TTN server to be used (in our case ttn-router-eu). Press save



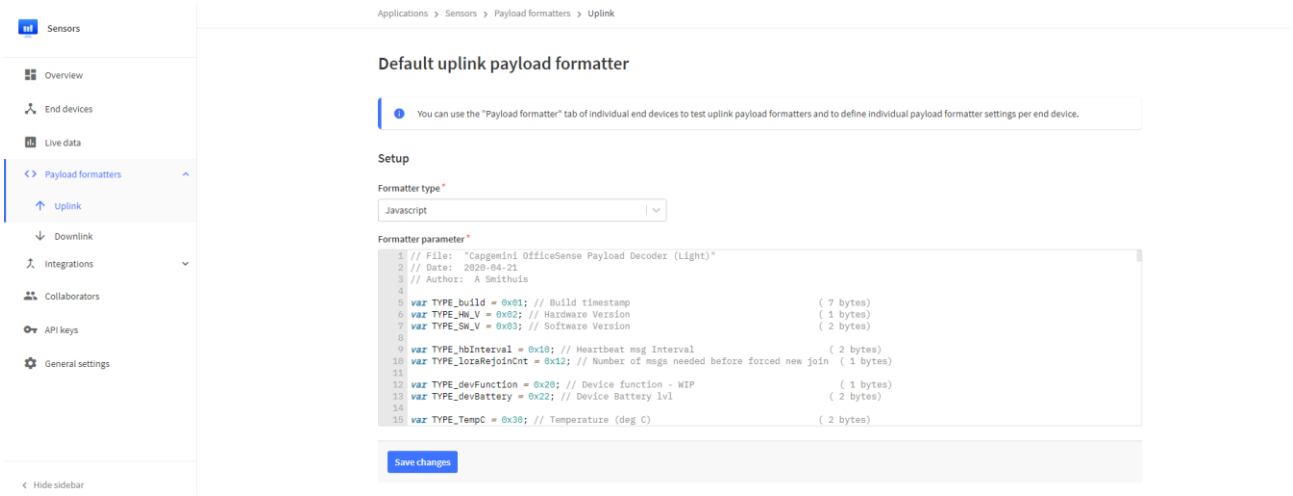
When you save the page, you will have a gateway key that you can copy to be used later in the gateway to synchronize the gateway with TTN.

3.3 CONFIGURATION IN THETHINGSNETWORK

Go back now in TTN console https://console.thethingsnetwork.org and click on Applications>add application. Define here your Application ID, you can add a description adnd the region of usage and click save. The Application ID generated here will be used in TEOS for the authentication of TEOS with this application.



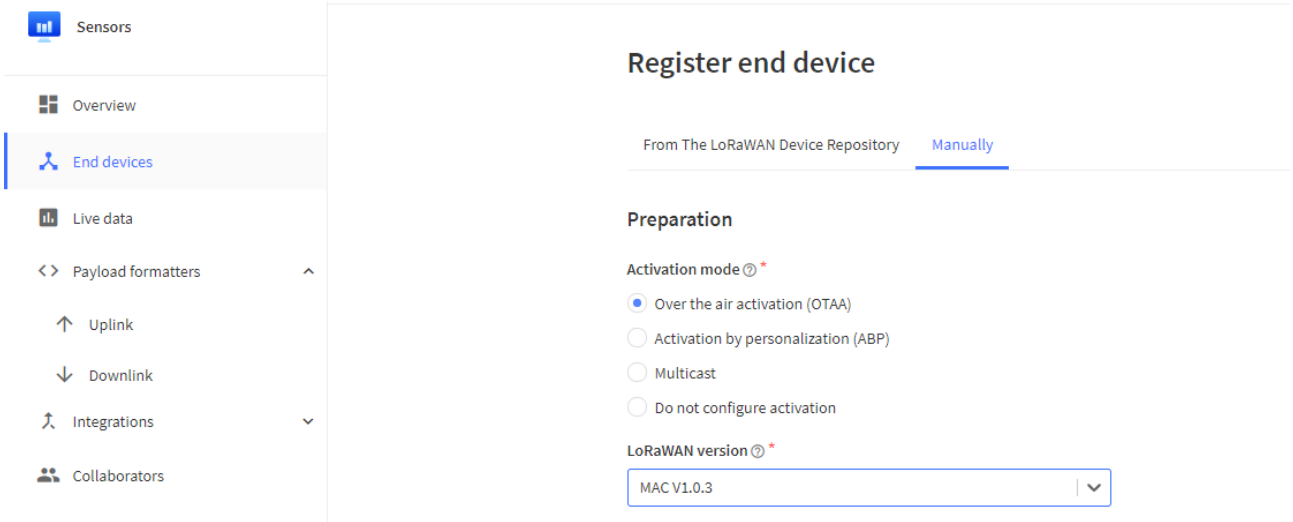
Enter in your application to add the payload data for TTN to decode the data sent by the sensors, add the type of data you are expecting and the device in this page. Go to payload formatters and uplink. Select javascript and add the following script in the platform. Script can be found under https://bit.ly/sonypsetech under Building and ioT for TEOS or under https://teos.solutions/resources



Add your TEOS Sensors into TTN platform.

For that go into Applications > Devices and add a device, add a device ID, the device EUI (for TEOS sensors) is directly into the device and can be sent separately with the app key which is another security key.

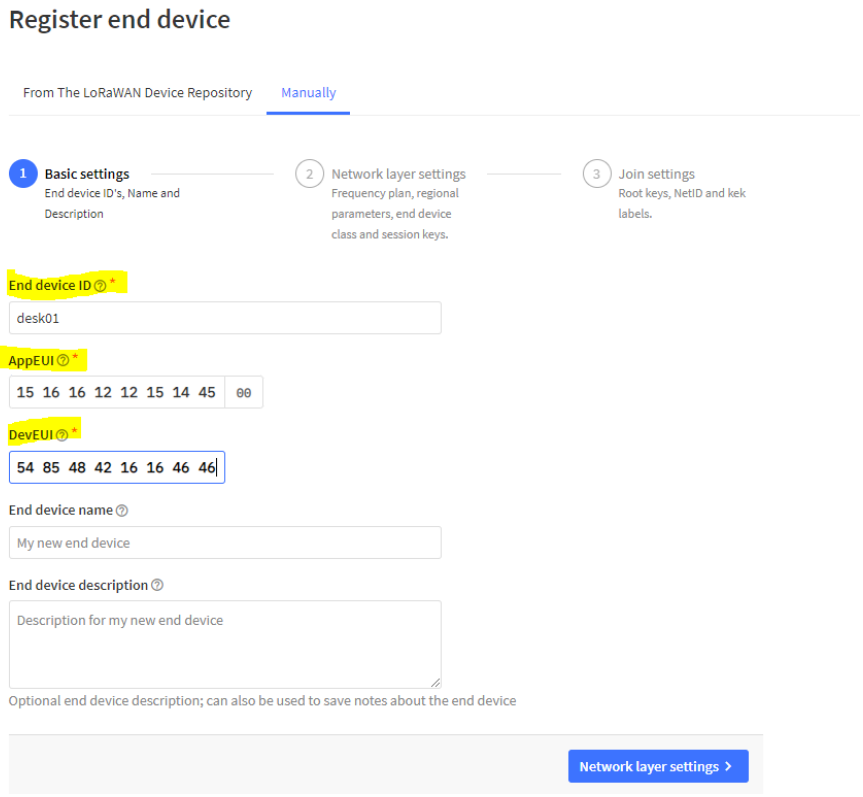
Press add end device and select manually and select the LoRaWAN version which **is MACV1.0.3**



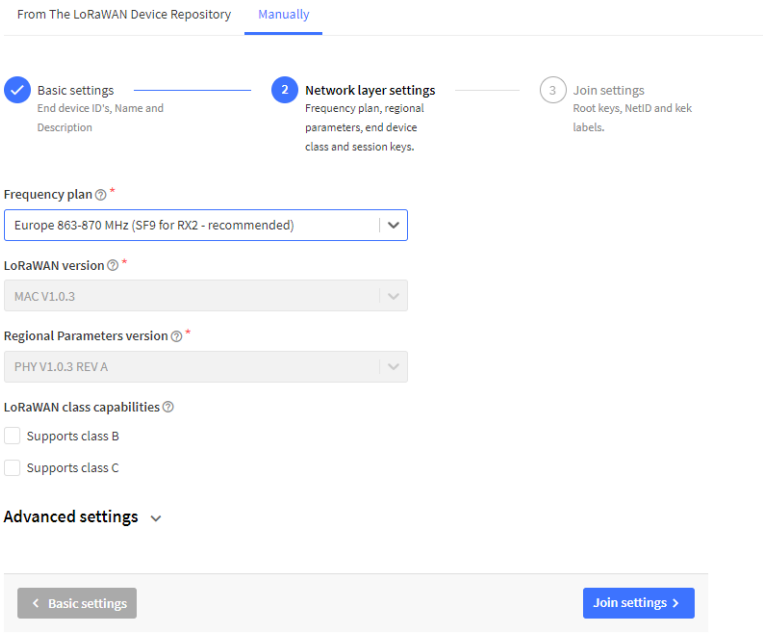
Press start and in the next page insert the end device ID (the one you want), and add the appEUI (you receive in the list from us) and device EUI (which is shown directly in the device hardware sticker. Press after network layer settings to go to the next step.

For TEOS sensors, the application EUIS are:

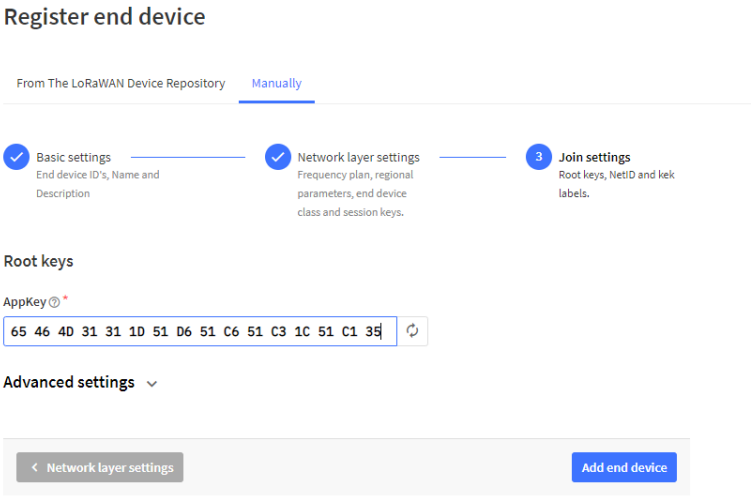
- DESKSENSE (desk): 70B3D5FFFE0B5505
- OFFICESENSE2PRES (Presence sensor): 70B3D5FFFE0B5501
- OFFICESENSE2COMF (comfort sensor): 70B3D5FFFE0B5502



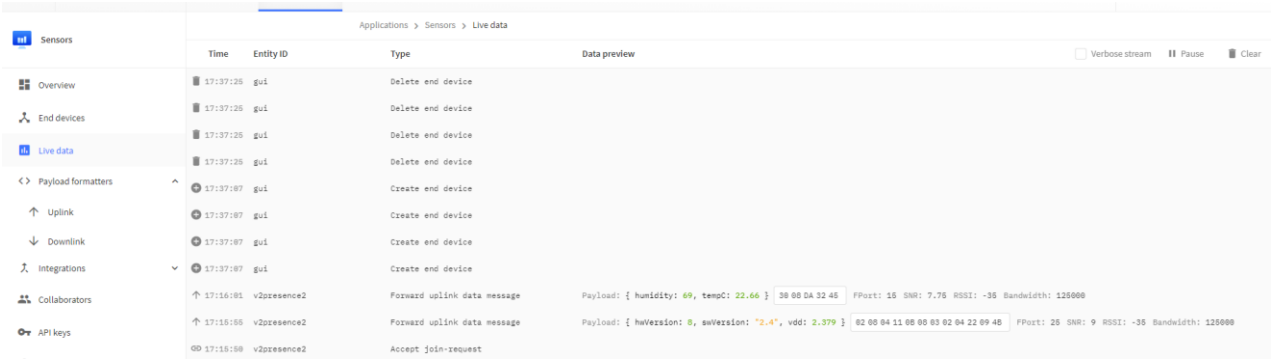
Select now Europe 863-870 MHz (SF9 for RX2 – recommend) frequency for Europe and press join settings



Last step is to add the AppKey that you receive in the list of device when purchasing. Press Add end device to finish the process.



The configuration is now done, you can check the data received and converted by TTN under the "Live data" page for all the devices on your application or per device.



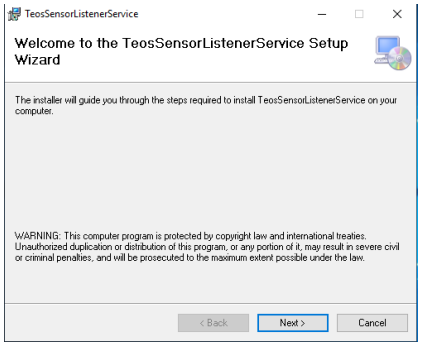
3.4 INSTALLING AND ENABLING TEOS SENSOR SERVICE (ON PREMISE)

This section explains how to enable into TEOS the possibility to use KNX, DALI and LoRa devices.

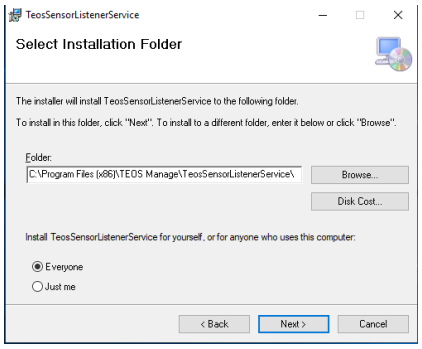
Install Sensor Listener for Service TEOS into your TEOS Server

First, you need to go to your Manage for TEOS Server as an administrator. Download the file Sensor Listener for TEOS Server Setup_1.3.msi (you can download it HERE). Or you can find it under https://bit.ly/sonypsetech under 5.1 building and iOT for TEOS. It can also be found under https://teos.solutions/resources

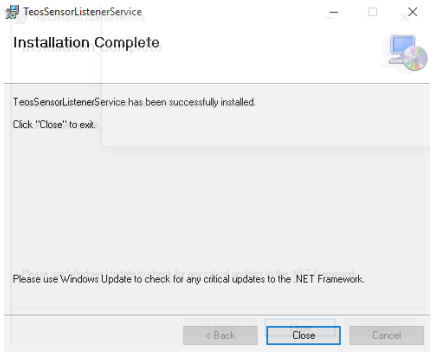
In your Manage for TEOS server, run the software and press "next"



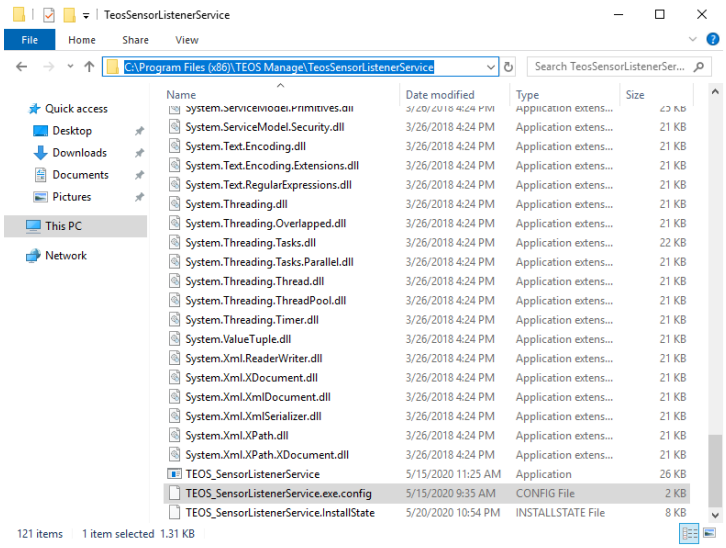
Choose the path for the installation, by default C:\Program Files(x86)\Manage for TEOS\SensorListenerServerforTeos



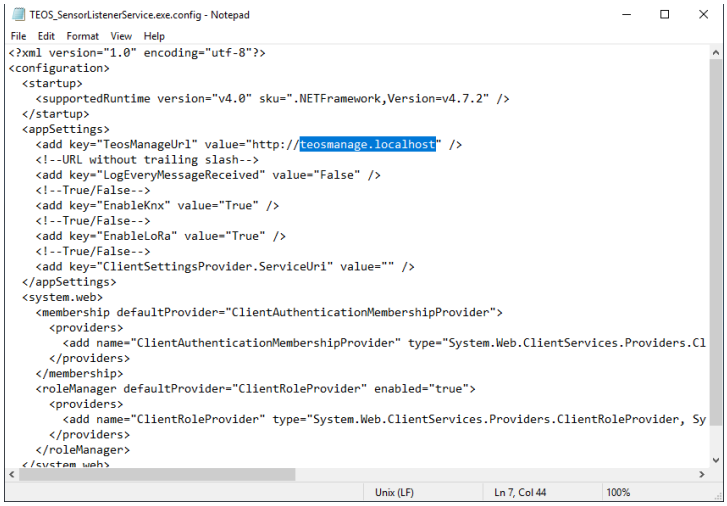
Click “next” and finish after the installation is done.



Go to C:\Program Files(x86)\Manage for TEOS\SensorListenerServerforTeos and open the file TEOS_SensorListenerService.exe.config with a notepad

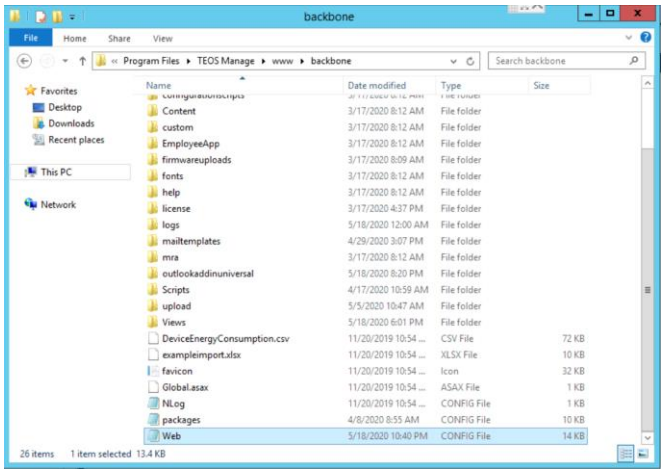


Change in the value of the key Manage for Teos Url with your own server name

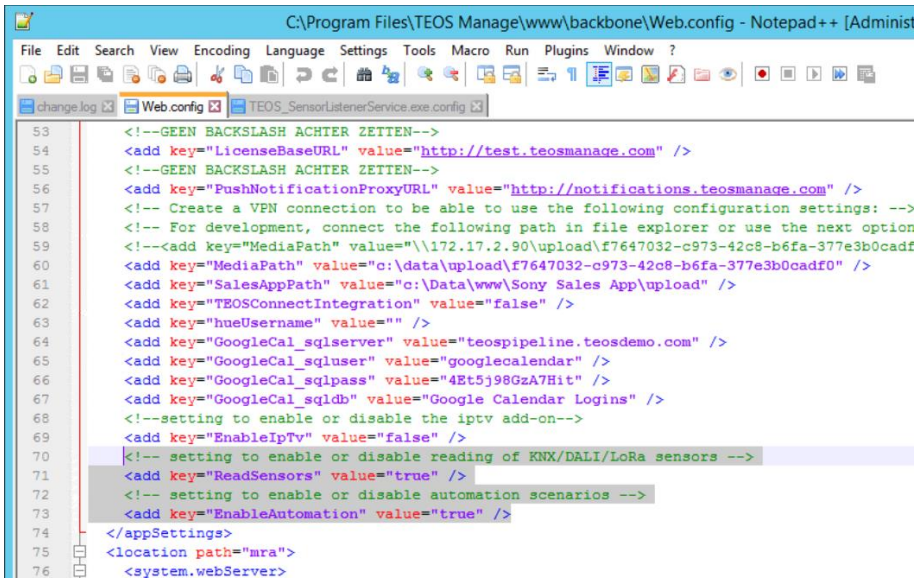


Enable Sensor Reader under TEOS Backbone web.config

Go to C:\Program Files\Manage for TEOS\www\backbone and open the file “web.config”.



On lines 71 (ReadSensors) and 73 (EnableAutomation) change the value from false to true.



TEOS is now ready to receive and send data using the different building protocols.

Go to Services under your server and start the TEOS Sensor listener service. Make sure the service is also setup in automatic to restart automatically if the server reboots.

3.5 ENABLING TEOS SENSOR SERVICE (TEOS CLOUD VERSION)

For the cloud version of TEOS, please contact the TEOS Support team fort hem to enable the sensor service, support@teos.support with your tenant name and you tenant will then be able to receive sensors data.

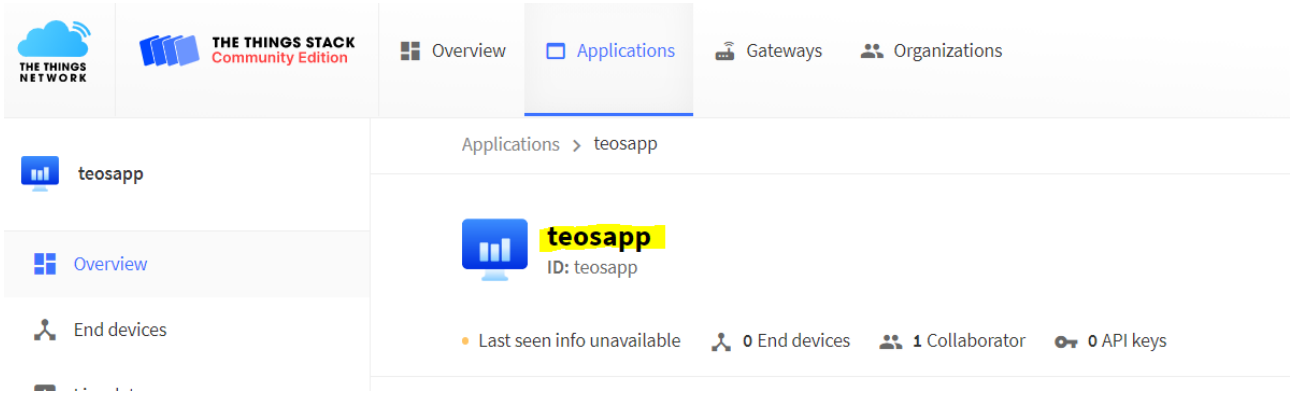
3.6 ADD A LORAWAN CONTROLLER AND SENSORS IN MANAGE FOR TEOS

Go to Manage for TEOS > Administration and select Building and iOT. When you select LoRa controller in the controller brand, insert a name of the controller.

Select the TheThingsNetwork region you want to use (in our example select eu.thethings.network). Put after the application ID you have configured in the section upper and the TheThingsNetwork access key generated.

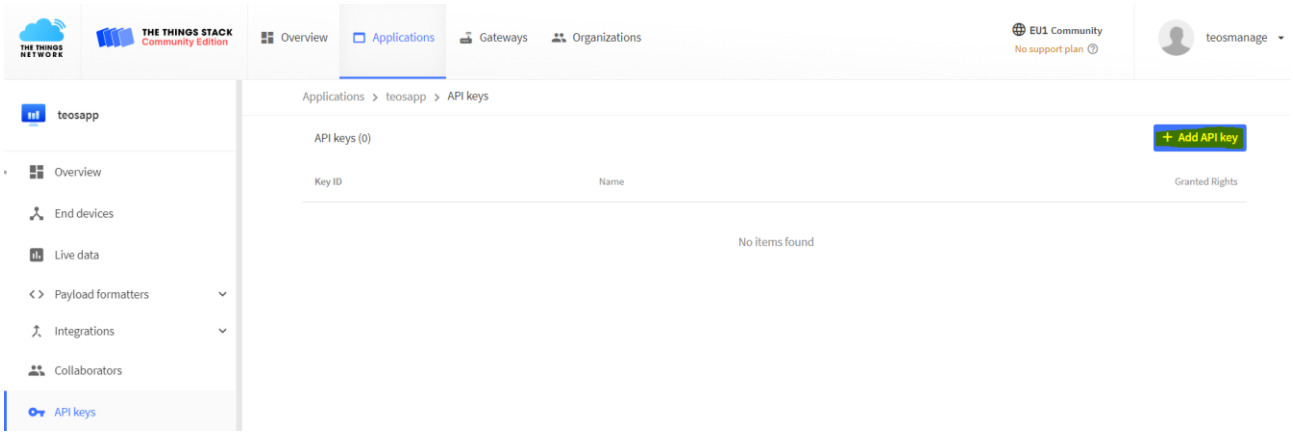
If you are using the version 3 of thethings network (eu1.cloud.thethings.network), choose under TEOS the Custom option and insert the following URL: eu1.cloud.thethings.network.

Under the Application ID part, insert the application ID created when adding sensors and for thethings network you need to add "@ttn":

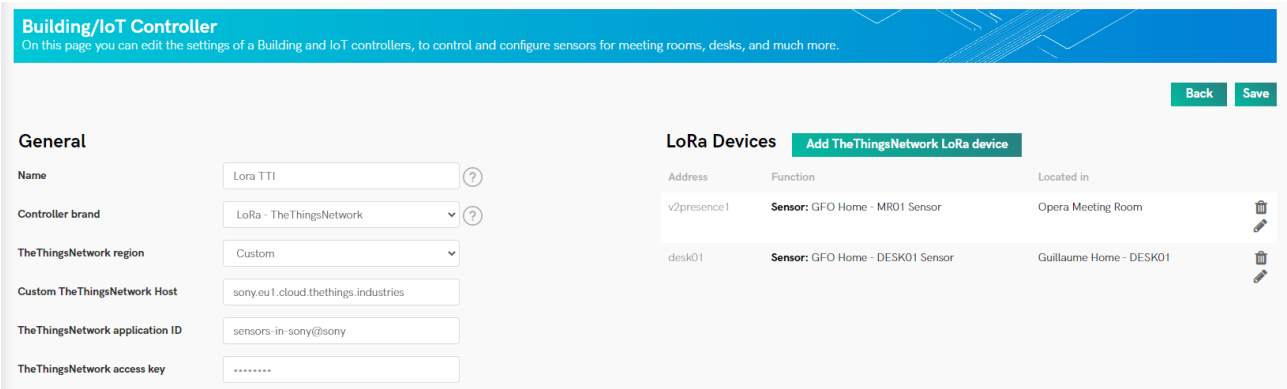


This means for this example in the Application ID to insert in TEOS, you will have something like teosapp@ttn (appID@ttn). If you use other accounts, maybe a private one you will need to put appID@tenantname.

For the access key, go under application and API keys to generate the key that will be used by TEOS to authenticate to TTN.



The next step is to add sensors to TEOS. If you sensors are registered under the same application ID, you will simply need to add them inside the account created under TEOS, no need to create different accounts under TEOS to connect to the same Application ID.

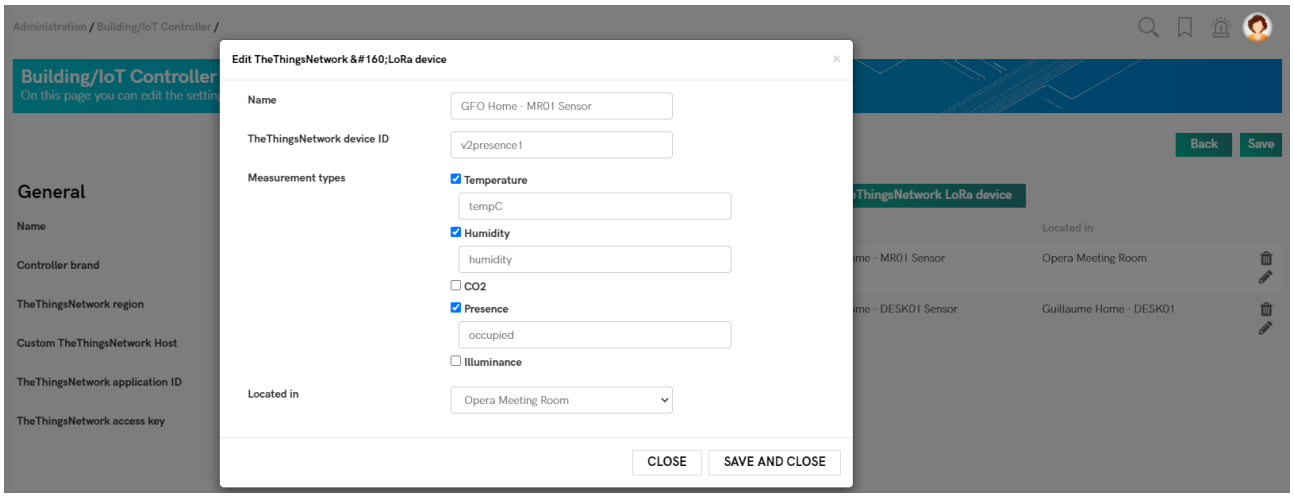


To add a sensor into LoRa you need to know what type of information

Using TEOS Sensors (DESKSENSE, OFFICESENSE2PRES, OFFICESENSE2COM) Manage for TEOS can get the following data from each sensor:

- Desk:
  - Occupied
  - Battery level (when starting and each 12hr, in TTN)
- Presence sensor:
  - Occupied
  - Humidity
  - TempC (temperature in Celsius)
  - TempF (temperature in Fahrenheit)
  - Battery level (when starting and each 12hr, in TTN)
- Comfort sensor (old version, new version will get the luminance):
  - Co2CalCounter
  - Co2
  - Humidity
  - TempC
  - Battery level (when starting and each 12hr in TTN)

Insert the name for the sensor in TEOS, add the name of device created in TTN in device ID. In measurement type, add the values you want to be retrieved from the sensor into TEOS. You can define the location of the sensor, for example in a meeting room to be able to show the data into the site overview.



Temperature field is: tempC, Humidity field is humidity, Presence fied is: occupied

Important to know

About npositive and nsample (that can be seen into TTN) Sensor incorporate a false/positive routine. nSample is the number of samples taken during this routine (which by default should be 6) and nPositive are the amount of those samples where motion was detected. You will see that when over half of those samples are positive (so at least 3) the device will report presence.When the device releases the room (occupancy = 0) these values will be set to 0, which is what the message in your picture represents. Look when the device reports presence (occupied = 1), these fields will have a value.

About presence detection workflow on both desk and presence sensor:

The presence and desk sensors incorporate basically the same routine (with slightly different time offsets). They do not report the presence information at a fixed interval but rather on a state change of the room/desk (part of what makes sensors more intelligent and prolong the battery life).

The first message indicating the room/desk is occupied will be sent within a few seconds (up to 30 seconds for the desk) after a person takes place behind the desk or inside the room.

The sensor uses this time to go through a false/positive routine to verify someone is indeed there and it was not just someone walking by, grabbing a chair, etc.

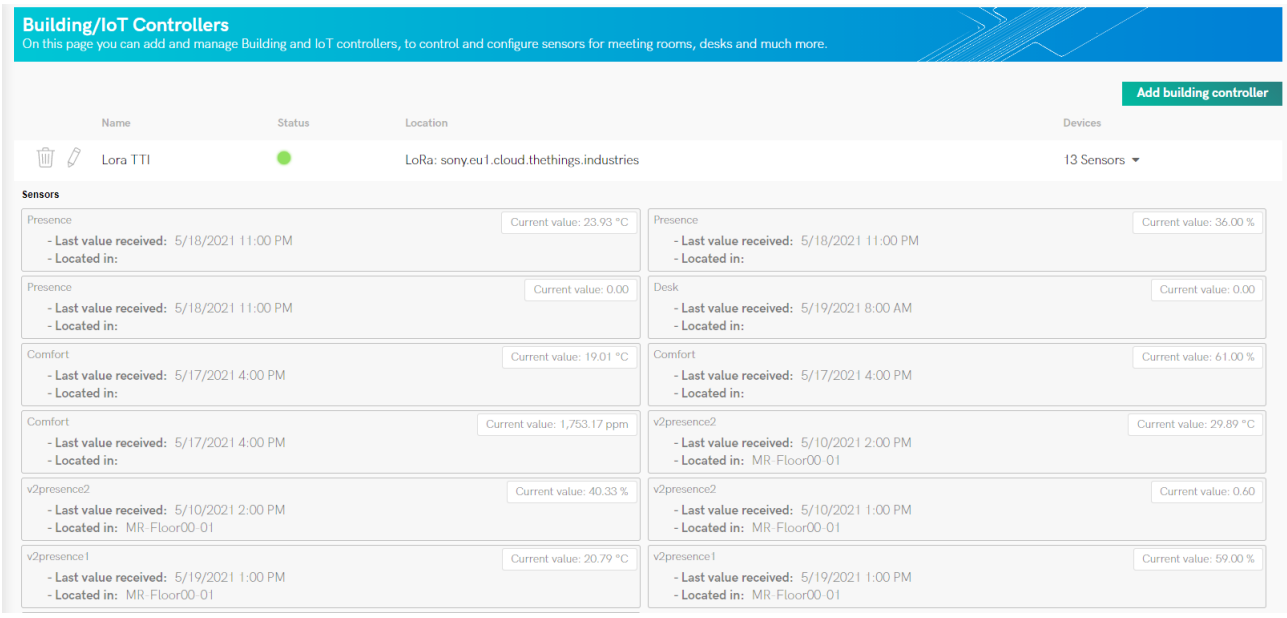
At set intervals, the sensor will again verify if someone is still present by going through the same false/positive routine. Whenever no one is there, the sensor will (after a set time) send a second message indicating no one is there anymore.

So, because of this routine the time between the 2 messages (occupied, not occupied) can vary depending on the presence of a person and is not a fixed time.

As for the maximum time to release a room or desk again: the presence sensor will take up to 5 minutes after the person leaves the room to release it again. For the desk this is somewhat longer (up to 30 minutes) to be able to grab a coffee without releasing your desk in the meantime.

All the data (like temperature etc.) is shown at the same time of the presence detection.

When the integration of the sensors you can see all the data refresh into TEOS.



4. Automation scenarios with Sensors

4.1. Room/desk booking, check-in and check-out

Within TEOS solution one of the target is to make space efficient and simple to use. Thanks tot he sensors technology the following workflows can be achieved in the automation scenarios

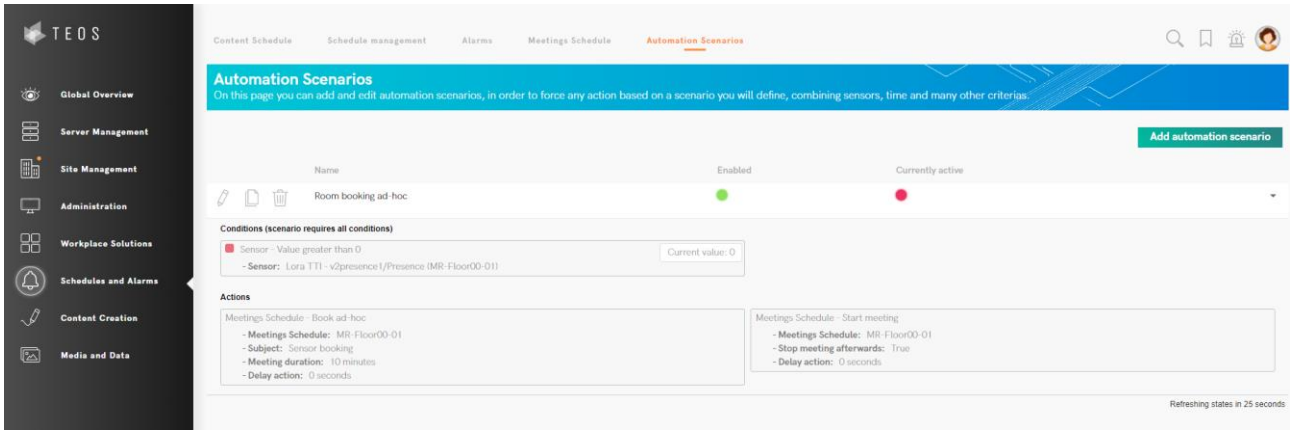
1) When room is booked and waiting for a checkin, the sensor detects a presence and the checkin is automatically done. If there is no presence, the checkin is not done and the room become available

2) When the room is not booked and presence is detected, book the room for a selectable time in the automation scenario

3) When desk is booked and waiting for a checkin, the sensor detects a presence and the checkin is automatically done. If there is no presence, the checkin is not done and the desk become available

4) When the desk is not booked and presence is detected, book the desk for a selectable time in the automation scenario"

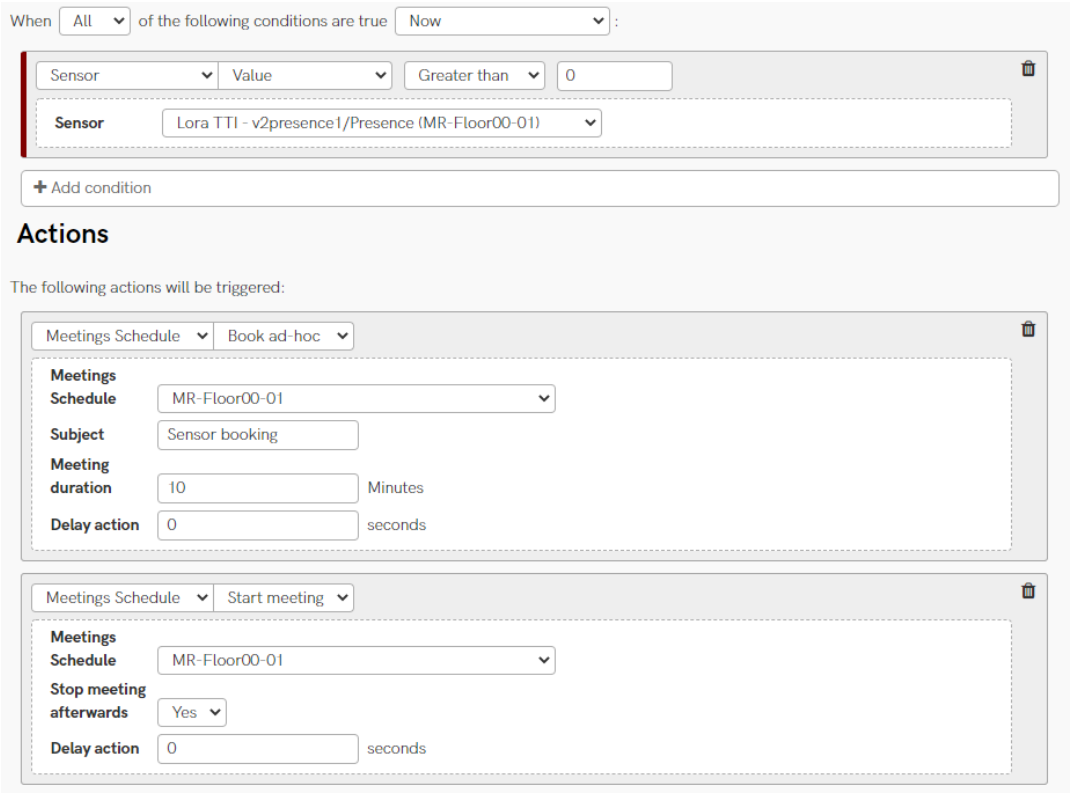
To make that possible after having your sensor connected to TEOS you need to go to schedules and alarms and to Automation Scenarios:



Create a new automation scenario where you select as condition the sensor to have a greater value than 0 and i fit is the case as actions tob ook automatically the calendar of your room with a subject such as “autobooking” and the meeting duration which is recommending to be 10 minutes or 5 minutes ranges.

If you want also to do the autocheck-in you can add in the action the start meeting option for the same room calendar with the option to autocheck-out if the is no presence. TEOS will manage the rest of the usage and will check every with a background task the statuses and calendars to make that workflow working.

This is different from for example the fact of starting a device based on the sensor detection, this will be done only once and when for example there is no presence, the state of the device will not change. You need to add another scenario fort he power Off if sensor as no presence.


When All of the following conditions are true Now :
Sensor Value Greater than 0
Sensor Lora TTI - v2presence1/Presence (MR-Floor00-01)
+ Add condition
Actions
The following actions will be triggered:
Meetings Schedule Book ad-hoc
Meetings Schedule MR-Floor00-01
Subject Sensor booking
Meeting duration 10 Minutes
Delay action 0 seconds
Meetings Schedule Start meeting
Meetings Schedule MR-Floor00-01
Stop meeting afterwards Yes
Delay action 0 seconds

5. Regulations

Legal notices

All information, including, but not limited to, information regarding the features, functionality, and/or other product specification are subject to change without notice. The manufacturer reserves all rights to revise or update its products, software, or documentation without any obligation to notify any individual or entity. All brands and product names referred to herein are trademarks of their respective holders.

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in an installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

Non-modifications statement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Caution

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:
(1) This device may not cause harmful interference.
(2) This device must accept any interference received, including interference that may cause undesired operation.
(3) This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multitransmitter product procedures.

Declaration of conformity

Hereby, the manufacturer declares that sensor is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.

SONY

For more Information
https://teos.solutions