About EnOcean NFC Tools

REVISION HISTORY

Version	Author	Reviewer	Date	Major Changes
1.0	CB	OS	09.Sep.2022	OS: review first version

Additional helpful information:

https://www.enocean.com/wp-content/uploads/downloads-produkte/en/products/enocean_modules_24ghz_ble/ptm-215b/user-manual-pdf/PTM-215B-User-Manual.pdf
https://www.enocean.com/wp-content/uploads/downloads-produkte/en/products/enocean_modules/ptm-210ptm-215/user-manual-pdf/PTM21x_User_Manual_Mar2022.pdf
https://www.enocean.com/en/product/ptm-535bz/?frequency=bluetooth
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https://www.enocean.com/en/products/enocean-software/enocean-tool/
https://youtu.be/rfqTBlPfd_Q
https://www.enocean.com/wp-content/uploads/redaktion/pdf/white_paper/c1216en_-_white_paper_nfc_energy_harvesting_en.pdf
https://www.nxp.com/docs/en/data-sheet/NT3H2111_2211.pdf

Important!

This information describes the type of component and shall not be considered as assured characteristics. No responsibility is assumed for possible omissions or inaccuracies. Circuitry and specifications are subject to change without notice. For the latest product specifications, always refer to the EnOcean website: http://www.enocean.com.

Where patents or other rights of third parties are concerned, liability is only assumed for modules, not for the described applications, processes and or circuits.
EnOcean does not assume responsibility for use of modules described and limits its liability to the replacement of modules determined to be defective due to workmanship. Devices or systems containing RF components must meet the requirements of the local legal authorities.

The modules must not be used in any relation with equipment that supports, directly or indirectly, human health or life or with applications that can result in danger for people, animals or real value.

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1   EnOcean and NFC

This Appnote provides an overview of currently available EnOcean NFC Tools provided to unlock the current and future potential of energy harvesting wireless technology and identifies their target customers. More information to the combination of energy harvesting and NFC in user manuals and under: https://www.enocean.com/wp-content/uploads/redaktion/pdf/white_paper/c1216en_-_white_paper_nfc_energy_harvesting_en.pdf

1.1   What is NFC (short answer)

NFC or Near Field Communication is a very short-range, one-to-one wireless communication for simplified transactions, data exchange, pairing and wireless connections between two devices. The communication between an active transmitter device called "NFC Reader" and a NFC interface called "Tag" needs proximity of few cm, ensuring strong data privacy.
Typical NFC communication mode commonly used for energy harvesting devices: Read/Write (specific device Data, Configuration, Commission)

1.2   Why NFC for EnOcean?

NFC is a low-power standard using energy harvesting technology for communication. The energy harvested from the RF transmission of the NFC reader powers the NFC transponder (tag), enabling connectivity of these devices to the Internet of Things (IoT). These IoT devices can be e.g. self-powered switches and sensors NFC-enabled by the EnOcean technology. As NFC use its own source of harvested power, it does not require the primary energy (actuation of the switch module or light exposure) to trigger the functionality of an EnOcean device. This allows a seamless integration into EnOcean energy harvesting technology devices without HW constraints but with many additional benefits.

NFC basic functionality allows to customize parameters and settings of NFC-enabled EnOcean modules. Therefore, self-powered switch and sensor modules having an NFC interface can be put into operation and commissioned now much easily – even in the packaging unit – using specific external NFC readers or NFC apps for smart phones and tablets. The added capabilities include:

1. Read out the unique product identification including all specific parameters like IDs, link tables, tags, functionalities, EEP and other preconfigured settings. For example, whether a PTM switch module is configured for one or double rocker switches.

2. Write the product ID including all specific characteristics, e.g. switch design, provider, location and function to the integrated NFC tag.

3. Quick and easy configuration and commissioning on- and offsite.

4. Update the application firmware.

1.3   EnOcean Energy Harvesting and NFC – the perfect Duo!

A quick and easy specific system implementation is key when it comes to realizing sensor systems for intelligent buildings and IoT applications. Especially, when there are thousands of sensors in a single building, delivering the required data for individual and demand-based processes. With the help of Near Field Communication (NFC) you can configure and install modern EnOcean devices in a simple, quick way exactly fitted to individual demands and environments.

How does this work? With this type of wireless communication, information is received or transmitted from an NFC interface – wireless and self-powered EnOcean module – to an NFC reader over a short range of few centimeters. These can be, for example simple NFC-enabled smartphones, tablets or PC via extern NFC reader. The short distance between the two devices makes NFC especially great for data transmission, as your data is being highly protected.

2   NFC value add advantages (not only) for IoT players

The integration of NFC capabilities into EnOcean energy harvesting products is a future-proof step in the rapidly evolving IoT market. Here, deeply connected intelligent systems build the basis for digitized building areas and services. A major success factor of such digitization projects is the easy commissioning and programming of thousands of different sensing devices in a building delivering the data needed for individual and demand-based optimization processes. This addresses several players involved in the IoT value chain like OEM product manufacturers, OEM customers, BA planers and end users @home.

1. Products that integrate NFC-enabled EnOcean devices can be configured and adapted according to the current individual customer target either prior to delivery by OEM or later in field by end user. As a result, OEMs only need to stock the basic product and then make certain settings, e.g. parameters and frequency, just before product is shipped. This saves storage costs, while OEMs can more quickly respond to individual customer requests, such as setting EnOcean Equipment Profiles (EEP), commissioning or configuring specific security requirements.

2. NFC allows easy off-site and off-power commissioning, meaning that link tables, security codes and any other parameters of line-powered devices can be changed, even when the device itself is actually not powered and packed in a box, allowing fast changes of pre-configured product packages or error diagnosis. Specific product information can be written in every NFC tag of an EnOcean product, e.g. installer/service provider digital business card, switch design (single or double rocker) and icons on the rocker (lighting or shutter control).

2.1   Two different, but complementary NFC Tool approaches from EnOcean

A PC based App, together with an external, USB based dedicated NFC Reader is available for advanced OEM users and offers best NFC range and complete functionality. A simpler App with limited feature set can be downloaded on smart phone/tablet for both IOS and Android.

Important: Before start making any configuration changes, be sure to familiarize yourself with the device functionality. Should you be unsure about the current/changed NFC configuration, then execute a factory reset as described in user manual, to reset all configuration registers to their default setting. After completing the NFC configuration and ensuring that all functionality works as required, it is recommended to lock the changed NFC configuration interface by changing the NFC PIN code from its default value to a different (secret, secure) value. Make sure the new PIN code is properly noted down!

3   EnOcean NFC Configurator (for PC with external NFC Reader)

EnOcean provides a NFC Configurator PC App for OEM Partners at no cost to configure and commission EnOcean GmbH products with NFC interface. NFC Configurator is a PC application enabling to write / read all accessible parameters specified for the product. Configured device parameters can also be stored into a separate file for devices configuration cloning or for sharing with other users. It also includes a simple option to execute "batch programming" for small quantities and log the process.

System SW & HW, minimal Requirements:

OS: Windows 10 and .NET Core

HW: CPU 1.5GHz, 2 GB RAM, 200 MB Disc Space, Screen resolution at least 1680×1050

The NFC configurator PC app has been designed to work exclusively with a customized external NFC reader type TWN4 made by Elatec, programmed with Elatec CDC Firmware, Elatec internal order number: *T4BT-FB2BEL2-SIMPL*.
We strongly recommended to contact Elatec Sales or its authorized distributers directly before purchase while referring to the specific internal order number mentioned above
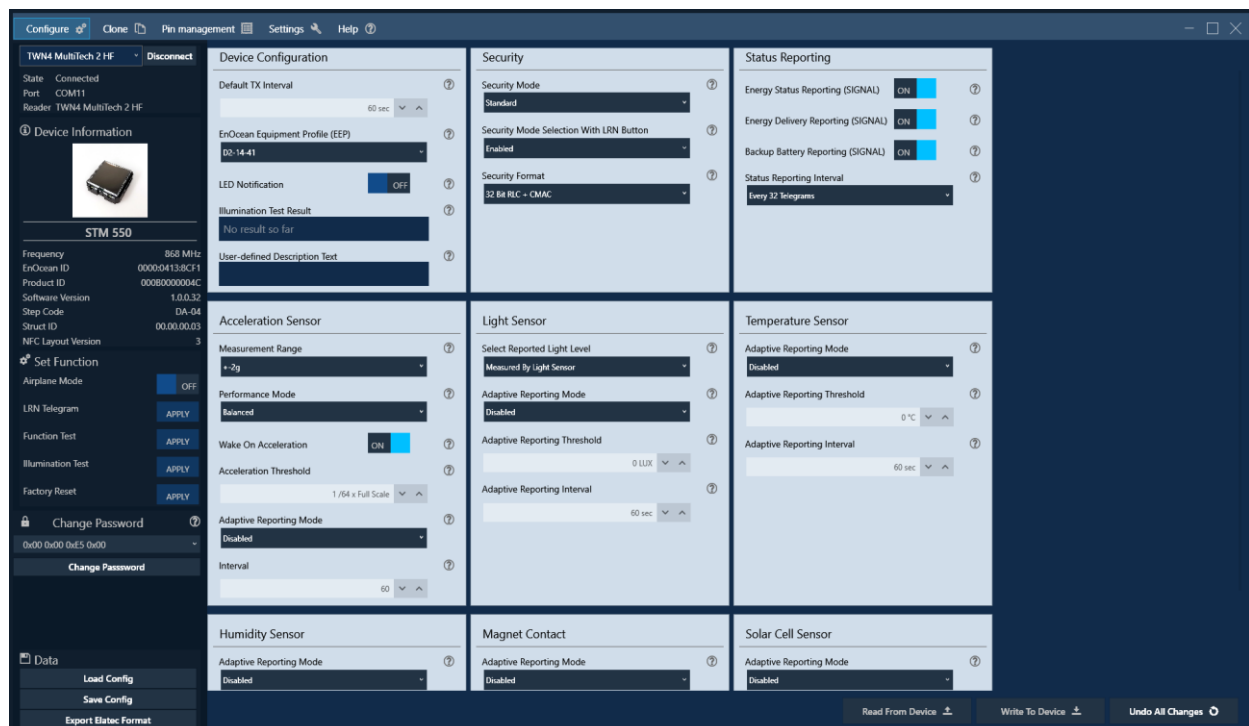
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EnOcean NFC Configurator is an advanced development tool, which enables deepest possible device setting changes, requiring correspondingly detailed technical knowhow from user. It may only be used to read and configure products purchased from EnOcean via authorized sales channels in conjunction with above mentioned special order number Elatec reader.

How to install and get start, step-by step:

1. Order above mentioned SPECIAL order number version by Elatec and double check that the order number is really the correct one, because only this Elatec Reader version comes with the customized USB virtual COM Port interface. The Reader will be used as an external HW interface between the downloaded PC Program named EnOcean NFC Configurator and the EnOcean NFC-enabled devices, see next steps.

2. Go to https://www.enocean.com/en/product/enocean-nfc-configurator/. Here you can find the related info.

3. Please login or register first for download (required, free of charge).

4. After download on your PC, make sure that you your Elatec Reader is connected to PC and start the before downloaded EnOcean NFC Configurator Program on your PC.

5. Following screenshots shows the default Configuration features, Help and Clone menus.

   As you can see left in screenshot, you can find all specific device (e.g. below STM 550/multi-sensor and EMDC) pictures and information. You can set certain functions and customize almost every single setting of the device default configuration on the right side (read/write/undo). Because some of them are quite critical, correspondingly background knowhow is required: e.g. before making changes, be aware that some sensor settings are strongly dependent on its energy balance at a given location, leading in worst case to a negative energy balance and communication failure on mid/long term. These refers e.g. to TX Reporting (adaptive/performance Mode/Interval), even the chosen EEP or security settings.
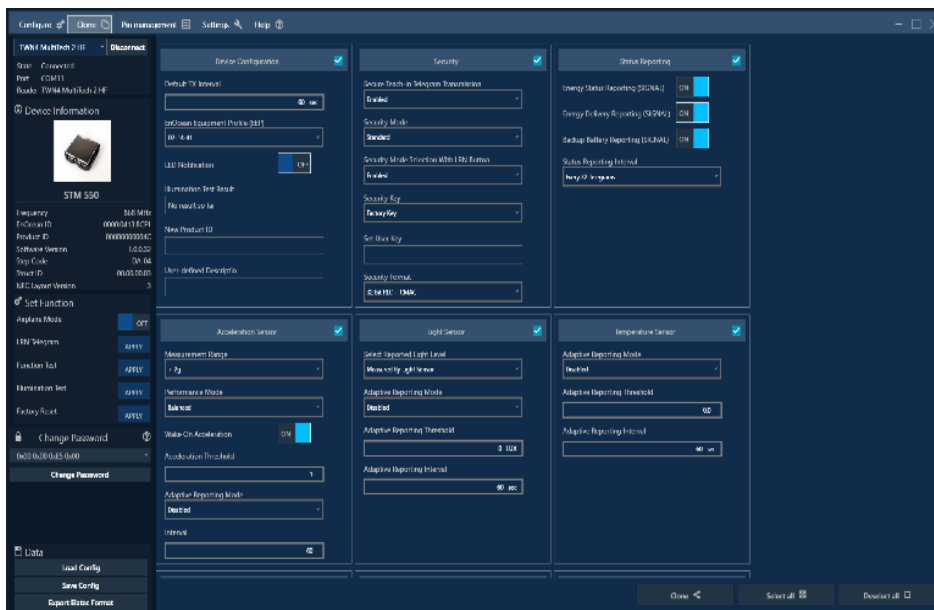
   Under "Settings" Menu, you can also switch ON/OFF a hidden "Expert Mode" configuration ("This is restricted only to advanced partners specially trained by EnOcean")
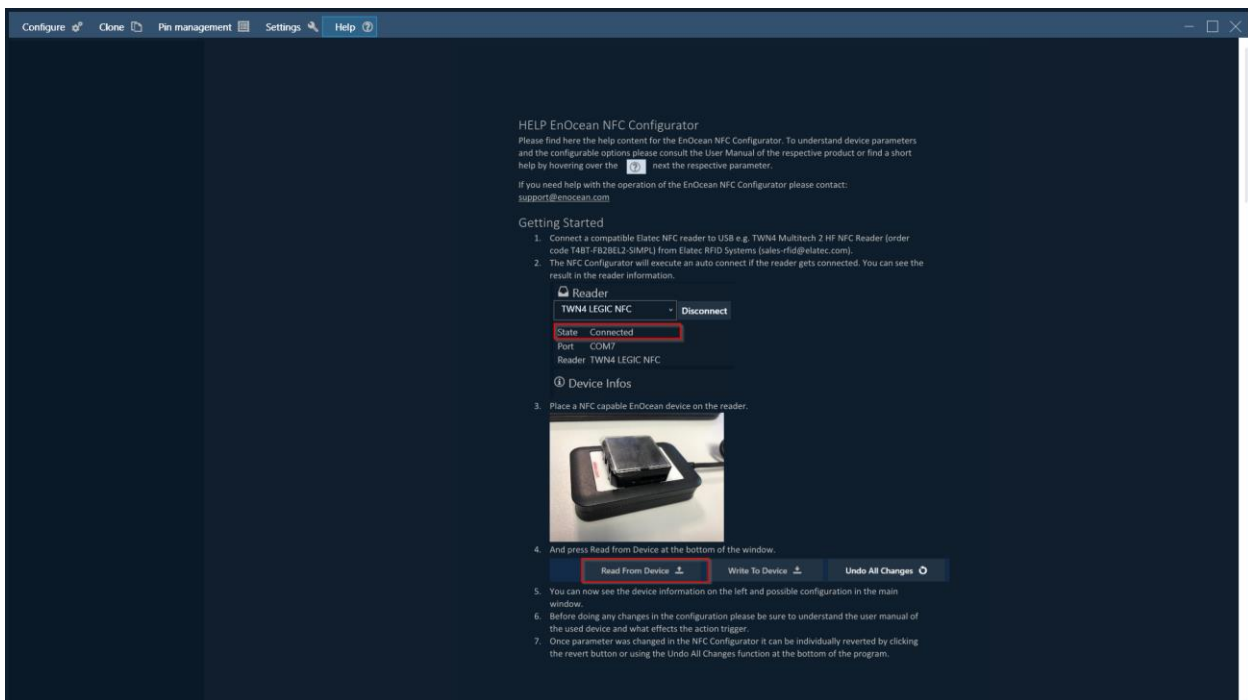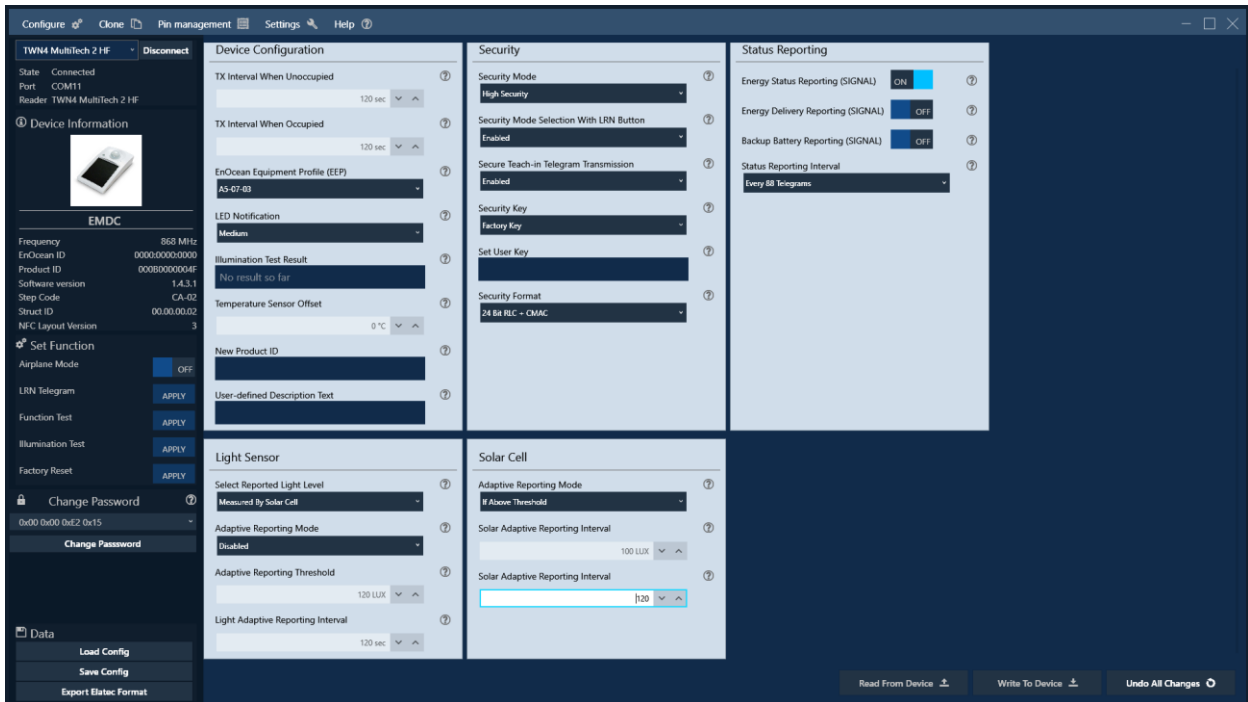
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Additionally, customized specific configuration can be saved/loaded, exported or used to clone other devices.

4 EnOcean NFC Tool (App for smart phone/tablet with NFC Interface)

The EnOcean NFC Tool for handheld devices is an easy-to-use tool with limited feature set, designed for installers in the field. It supports all typically needed tasks, such as putting devices into operation mode, trigger Learn messages, change common parameters, etc.

Requirements: Android or iOS (iPhone7 or newer with iOS 13 or higher) smart phone or correspondingly tablet with integrated NFC interface.

With our EnOcean NFC Tool, the properties of selected EnOcean devices can be determined and individual information can be quick read out everywhere. The existing NFC interface of your handheld device connects directly to EnOcean NFC-enabled modules, w/o the need of any additional gateway or interface.

The EnOcean NFC app, provided as a complementary tool for everyone enables the user to:

- Read/Write device specific data, function and placement, service/setup provider information and contact data, all independent from device working frequency.

- Read/Change EnOcean Equipment Profile (EEP) of the device accordingly user manual.

- Tuning of energy balance via selected EEP and reporting intervals according to specific use case.

- Monitor the current solar panel delivered power and energy balance.

- Advanced Security and Encryption related configuration setup.

Note that by direct comparison, some features of EnOcean NFC App are intentionally limited compared to the PC based Tool for easier use and a different target user group. The EnOcean NFC App, intended to be an easy Tool for "everyone" in the field however offers an unique feature regarding EnOcean modules using the Bluetooth Low Energy protocol (BLE): all radio transmitted sensor values like temperature, humidity, light, room occupancy, incl. associated local current radio signal strength are displayed direct on the smart phone. Consequently, a simple stand-alone usual smart phone w/o any other external HW reaches to check immediately the full functionality of NFC-enabled EnOcean BLE transmitters everywhere in field.

How to install and use the App, step-by step procedure:

1. Direct App download from App Store or Google Play is possible via QR codes or appropriate links integrated into the current EnOcean manuals. Alternatively, you can go to https://www.enocean.com/en/product/enocean-tool/ or search directly for "EnOcean Tool" in your app store. Apps are available in English and German.

2. Choose accordingly your smart phone operating system Google Play or App Store and install the EnOcean NFC App

3. Watch our short tutorial video: https://youtu.be/rfqTBlPfd_Q

4. Switch on (if not already on) the NFC functionality of your mobile device

5. Start the app and place the NFC-enabled EnOcean device on the backside of your smart phone under its NFC antenna (back-to-back, e.g. place directly with the backside oriented to your smart phone backside, in direct contact). Move the sensor slightly around in case that this is not immediately found by app.

6. Once the NFC device is found by the app, you can proceed depending on your application requirements. Please refer to different example screenshots below; you just need to scroll on the display to discover all device specific info and features in order to choose the desired functionalities/settings, accordingly specific screenshot examples below. In doubt, please check the ⓘ Button (in the right upper corner, Help Section for respective Product). For more details, please refer to the EnOcean device user manuals, e.g. Configuration via NFC and NFC Interface/Parameters.
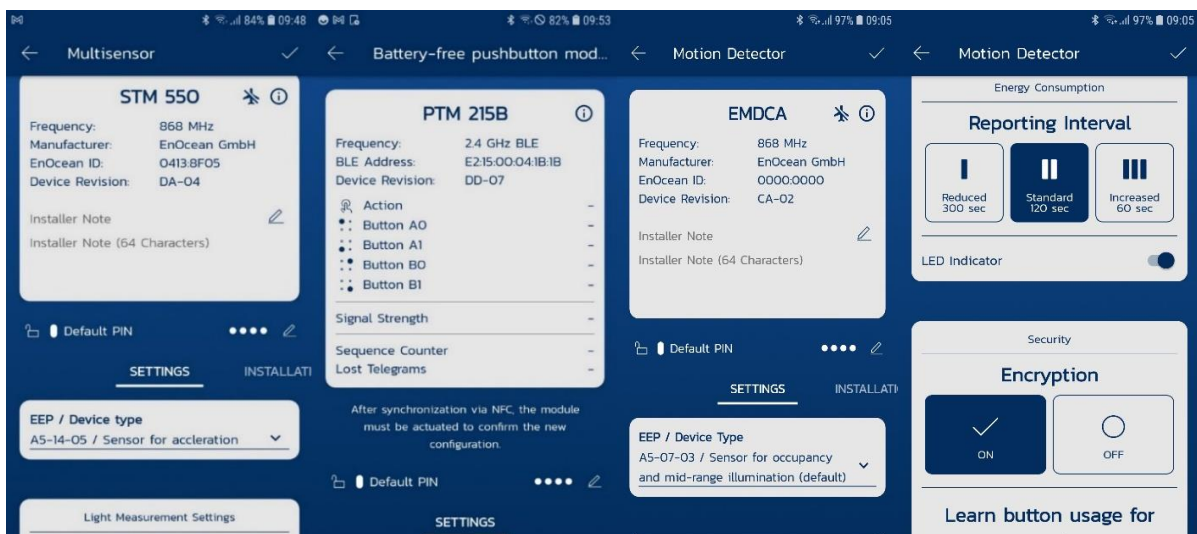
5   NFC and EnOcean, Key Benefits at a Glance!

NFC and EnOcean – Key Benefits at a Glance:

1. **NFC-enabled devices (sensors & switches), which had no configuration at all, can now be adjusted for the application and tuned in performance.**

2. **Smartphones can now talk to EnOcean devices directly without a gateway.**

3. **Anybody can configure EnOcean devices using an NFC-enabled smartphone or NFC reader.**