FAQ

Frequently Asked Questions – steute wireless radio switches

Why is steute EnOcean technology not compatible with other wireless switches?
EnOcean intentionally opted for an extremely short wireless telegram, because this is the only way to ensure that several hundred wireless switches can work reliably in a tight space. Conventional wireless switches take 70 to 100 milliseconds to send a wireless telegram, while an EnOcean telegram is delivered in less than a millisecond. Furthermore there exists the EnOcean Alliance to formalize the interoperable wireless EnOcean standard that is used across a wide range of products (see here for further information)

Can steute EnOcean technology be integrated in automation?
Yes, in the meantime there are more than 60 manufacturers offering EnOcean components for building automation. Wireless receivers are already available for automation systems from GTE, Beckhoff, Phönix Contact, Siemens, Wago and Wieland. Wireless gateways allow integration into all common building bus systems such as EIB/KNX, LON, TCP/IP and BACnet.

What is the range of steute EnOcean components?
In the open the range is typically up to 300 meters and in buildings up to 30 meters. To enable a longer range to be covered, steute can offer the FR 1K repeater module.

How can I check wireless coverage in my building?
For electricians and building planners, steute offers the handy EPM 300 level meter. A LED display indicates the signal quality of EnOcean transmitters at the intended location of a receiver. The device also enables location of possible sources of interference.

Are there likely to be problems if I want to integrate a steute EnOcean receiver in a control cabinet or metal enclosure?
Of course the basic principles of electromagnetic shielding through metal walls apply and the resulting, substantial reduction in range will also apply to steute receivers. If a receiver nevertheless has to be installed in a heavily shielded enclosure it is essential the magnetic antenna is always positied externally on the enclosure box.

How secure is EnOcean technology against manipulation?

Basic methods for security against manipulation are already implemented in the steute EnOcean system architecture: Each transmitter has its specific 32 bit ID as a fixed part of its transmitted telegram. This ID cannot be copied with the bi-directional steute EnOcean module.

Can Bluetooth communication (GSM cellphone, etc) interfere with EnOcean components?
No, because Bluetooth works to standard 802.15.1, which is an entirely different frequency band to 2400 MHz.

What is the situation like with data collision and latency?
EnOcean technology was developed to enable several hundred sensors to work in one radio cell at the same time. This is made possible by the extremely short telegrams (only about one millisecond) and triple redundant transmission with a random time shift. The sub telegram repetitions are a few milliseconds, which is the latency time. In the worst case (if all three sub telegrams are lost), data integrity is restored by cyclic presence telegrams. The time is for the most part selectable by the user.

Why did EnOcean opt for the 868 MHz frequency band and not for the 433 MHz band that is also commonly used in telemetry systems?
EnOcean technology works in a wireless channel at 868.3 MHz with a bandwidth of 240 kHz that has been released in Europe exclusively for short data transmission. All users of the wireless channel may only operate with 1% duty cycle, meaning maximum 0.6 seconds transmission in one minute. In contrast to the 433 MHz telemetry band, here the transmitting power is also limited for all users to 10 mW. At 868.3 MHz there is neither walkie-talkie operation nor the often very strong interference from medical radiotherapy apparatus. Nor are there radio amateurs, who can cause a lot of interference to secure wireless transmission.

What happens if, quite by chance, two different EnOcean switches in a room are operated at exactly the same time?
In principle the two wireless telegrams would interfere with one another of course, or the signal further away could be lost. But unlike in other wireless switch technologies, each EnOcean telegram is repeated twice within about 30 milliseconds for greater data security, the delay between the transmitted bursts being random controlled. This very fast and short multiple transmission enables many transmitters to work in parallel in tight confines on the same frequency and with an extremely low error rate. Statistically seen, even with 200 wireless sensors each transmitting once per minute, the possibility of a data collision is every 10.000th transmission.

Could an steute sensor accidentally trigger an incorrect switching pulse?
Each EnOcean module already has an individual 32 bit identification code, which is transmitted in each telegram – so 4.3 billion different modules can be addressed. Even if more modules are produced in future, the likelihood that two modules with exactly the same ID could be used in the same application is most extremely low.

How much electrosmog does an EnOcean switch produce?
The transmitting power of EnOcean components, as for all other conventional wireless switches, is only 10 milli-watts. But much less energy is radiated because the wireless telegram is so extremely short. A scientific investigation by the Institute for Socioecological Research and Education (ECOLOG) even showed that the emitted radio frequency field of an EnOcean telegram is one hundred times less intensive than that of a conventional light switch produced by the characteristic sparking when it is turned on and off.

For what kind of sensors does EnOcean technology work?
In principle this is of course a question of the energy balance. Basically EnOcean is suitable for all sensor elements that are only briefly operated. Typical times are 1 millisecond at a current of 2 milliamperes. On a 5 volt supply you then have a total energy need of about 10 microwatt seconds per measurement. This is of the order it takes to send a wireless telegram. A solar cell produces about 20 microwatts at 400 lux, a thermogenerator about 20 microwatts at 5 Kelvin temperature difference. So what is important is the ratio of measurement duration to the number of measurements in time (on/off ratio). Typically the measurement cycles should be in the range of seconds rather than milliseconds.

How secure is communication against noise fields in a rough industrial environment?
steute EnOcean technology is already used intensively in industrial environments, and has been successfully trialled in automobile engine compartments. Steute EnOcean wireless transmission is in a high frequency band where the typical spark chopping energy is relatively small. Plus, the specially selected timing of the triple redundant telegrams ensures very high resistance to interference in the typical industrial 50 to 60 hertz range.

What spacing should be maintained between EnOcean components and other wireless transmitters?
steute EnOcean transmitters may easily be installed next to other transmitters. EnOcean receivers, however, should be positioned at least 50 centimeters away from other transmitters (e.g. GSM, DECT, WLAN) and high-frequency sources of interference (computers, audio and video equipment and the like).

Can EnOcean components be disturbed by WLAN communication (wireless DSL adapter, audio transmission, etc)?
No, because WLAN components work to standard 802.11, and in entirely different frequency bands at 2400 MHz or higher.

Can EnOcean components be disturbed by ZigBee communication (short-range telemetry, etc)?
No, because ZigBee components work to standard 802.15.4, and primarily in the 2400 MHz frequency band. The ZigBee variant for the 868 MHz

frequency band works in a different wireless channel. A further ZigBee variant for use in the USA works at 915 MHz.

Which wall and ceiling materials cause how much loss in steute EnOcean wireless transmission?
Wood, plaster and uncoated glass attenuate between 0 and 10%. Brick and pressboard produce attenuation of between 5 and 35%. Concrete with iron reinforcement must be expected to attenuate between 10 and 90%. Metals and aluminium laminate show attenuation between 90 and 100%.

Will an steute switch let me pass through a wall? Given the physical propagation conditions in the frequency band that is used, it is even possible to penetrate a number of walls of normal material. Even thin structural steel concrete walls can be penetrated. In this frequency band, wireless waves reflected on walls may also penetrate through smaller openings.
In the case of walls of wood or gypsum plasterboard the typical range of EnOcean sensors is 30 meters or as many as five walls. For brick and aerated concrete walls the typical range is 20 meters or maximally three walls. For structural steel concrete walls and ceilings the typical range is 10 meters or maximum one ceiling.

How can I measure the receiving level of steute EnOcean sensors where I want to use them?
For these purposes steute offers its EPM 300 level meter