









# Mx-ASW1 / ASW2

## Self Powered Wireless Switch With Dimming Capabilities



### Installation (continued)

#### Transmission Range

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As the radio signals are electromagnetic waves, the signal is damped on its way from the sender to the receiver. That is to say, the electrical as well as the magnetic field strength is removed inversely proportional to the square of the distance between sender and receiver ( $E, H \sim 1/r^2$ ).

Beside these natural transmission range limits, further interferences have to be considered: Metallic parts, e.g. reinforcements in walls, metalized foils of thermal insulations or metalized heat-absorbing glass, are reflecting electromagnetic waves. Thus, a so-called radio shadow is built up behind these parts.

It is true that radio waves can penetrate walls, but thereby the damping attenuation is even more increased than by a propagation in the free field.

#### Penetration of radio signals:

<i>Material</i>	<i>Penetration</i>
Wood, gypsum, glass uncoated	90...100%
Brick, pressboard	65...95%
Reinforced concrete	10...90%
Metal, aluminum pasting	0...10%

For the praxis, this means, that the building material used in a building is of paramount importance for the evaluation of the transmitting range. For an evaluation of the environment, some guide values are listed:

#### Radio path range/-penetration:

**Visual contacts:** Typ. 30m range in passages, corridors, up to 100m in halls

**Rigypsum walls/wood:** Typ. 30m range through max. 5 walls

**Brick wall/Gas concrete:** Typ. 20m range through max. 3 walls

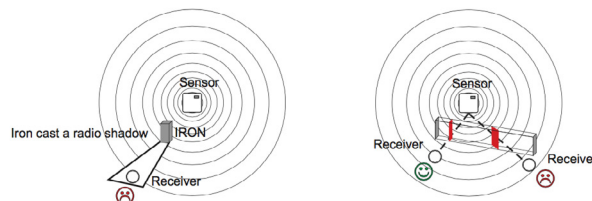
**Reinforced concrete/-ceilings:** Typ. 10m range through max. 1 ceiling

Supply blocks and lift shafts should be seen as a compartmentalization

#### Transmission Range (continued)

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In addition, the angle with which the signal sent arrives at the wall is of great importance. Depending on the angle, the effective wall strength and thus the damping attenuation of the signal changes. If possible, the signals should run vertically through the walling. Walling recesses should be avoided.



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### Installation (continued)

#### Other Interference Sources

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Devices, that also operate with high-frequency signals, e.g. computer, audio/video systems, electronic transformers and ballasts etc. are also considered as an interference source. The minimum distance to such devices should amount to 0,5m.

#### Find the Optimum Device Location by Means of the Field Strength-Measuring Instrument EPM100

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Under the description EPM100 we understand a mobile field strength measuring instrument, which allows the plumber or electrician to easily determine the optimum mounting place for sensor and receiver. Moreover, it can be used for the examination of interfered connections of devices, already installed in the building.

At the device, the field strengths of radio telegrams received or interfered radio signals in the range 868MHz, 902MHz or 928MHZ are displayed. Proceeding upon determination of mounting place for radio sensor/ receiver: Person 1 operates the radio sensor and produces a radio telegram by key actuation. By means of the displayed values on the measuring instrument, person 2 examines the field strength received and determines the optimum installation place, thus.

#### High-Frequency Emission of Radio Sensors

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Since the development of cordless telephones and the use of radio systems in residential buildings, the influence of radio waves on people's health living and working in the building have been discussed intensively. Due to missing measuring results and long-term studies, very often great feelings of uncertainty have been existing with the supporters as well as with the critics of radio systems.

#### High-Frequency Emission of Radio Sensors (continued)

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A measuring experts certificate of the institute for social ecological research and education (ECOLOG) has now confirmed, that the high-frequency emissions of radio keys and sensors based on EnOcean technology are considerably lower than comparable conventional keys. Thus, it is good to know, that conventional keys do also send electromagnetic fields, due to the contact spark. The emitted power flux density ( $W/m^2$ ) is 100 times higher than with radio sensors, considered over the total frequency range. In addition, a potential exposition by low- frequency magnet fields, emitted via the wires, are reduced due to wireless radio keys. If the radio emission is compared to other high-frequency sources in a building, such as DECT-telephones and basis stations, these systems are 1500 times higher-graded than radio keys.

#### Security Advice

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**CAUTION:** The installation and assembly of electrical equipment may only be performed by a skilled electrician. 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 or animals.