

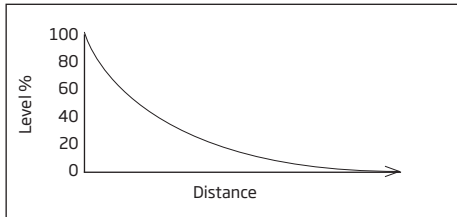


**RADIO SYSTEM  
INSTALLATION AND  
SIGNAL PENETRATION**

*eldes*®

## WHAT YOU MUST KNOW BEFORE INSTALLING THE SYSTEM

Radio signals are electromagnetic waves, hence the signal becomes weaker the further it travels, the range is limited.



The following material shows theoretically evaluated relation between radio signal strength and the distance among devices.

The radio coverage is further decreased by specific materials:

| Material                                     | Range reduction vs LoS*                                 |
|--|---|
| Wood, plaster, glass uncoated, without metal | 0 - 10 %  |
| Brick, press board                           | 5 - 35 %  |
| Ferro concrete                               | 10 - 90 %   |
| Metal, aluminium lining                      | <b>see chapter "How to properly install the system"</b> |

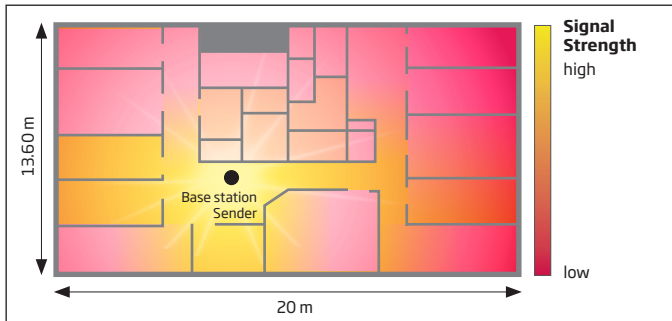
\* **LoS** (Short for "line of sight") - a term being used in Radio frequency technologies to describe an unobstructed path between the location of the signal transmitter and the location of the signal receiver.

The following should be accepted as suggestions and evaluated while installing your system:

- During the night time, when there is no movement at all, wireless signal level can decrease up to 17%.
- Furniture and movement can increase or decrease signal level by approximately up to 20%.

So, that means the sensor's signal level can decrease up to about 37% or even increase slightly, depending on individual environmental factors.

Spread of radio signal within a building:



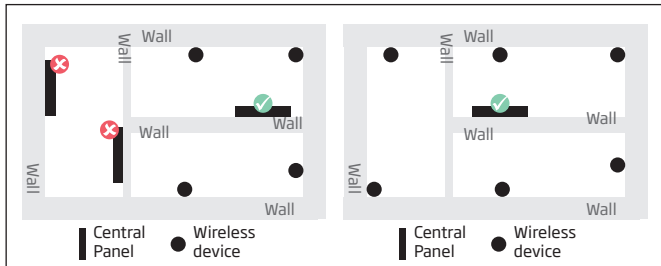
## HOW TO PROPERLY INSTALL THE SYSTEM:



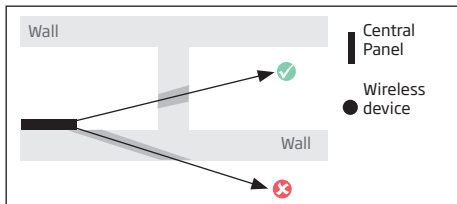
It is **HIGHLY RECOMMENDED** to install your system with the Service Mode enabled (using Configuration Tool software). This installation method will ensure a better protection against variable environmental factors ( the number of people moving throughout the secured area, material obstacles, etc.).

- Clear RF path of obstructions - Make sure the RF path is clear of obstructions. Antennas should be installed where they can "see" each other as much as possible. Make sure the antennas are high enough above any obstructions in the RF path.
- Pay attention to antenna alignment - Make sure the antennas are aligned correctly. In order to get the best result, you should mount your sensor according to their own manual's instruction, which you'll find at [eldesalarms.com](http://eldesalarms.com)
- Know you overall system gain required to meet the distance. The more the distance between the radios, the more the overall system gain needs to be. If the signal level between the system and your wireless device is equal or lower than 30%, then you must additionally use wireless signal repeater (EWR2).
- The longer the antenna cable and the more the number of connections, the more the signal loss. Please be aware that if you use antenna's extension cord or/and any other additional elements of wiring (cables,wires, etc.),then more antenna gain will be lost.

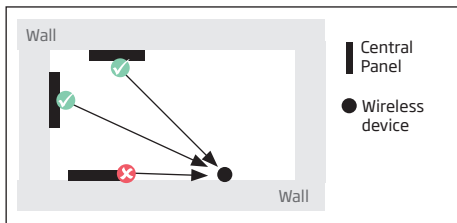
- We recommend that the best place for Central Panel installation is at the approximately estimated centre of all mounted Wireless devices across your premises (house/flat), and it's not necessarily the centre of a room itself, i.e. positioning basically depends on the total of the secured area. For a better visual perception, see the following picture:



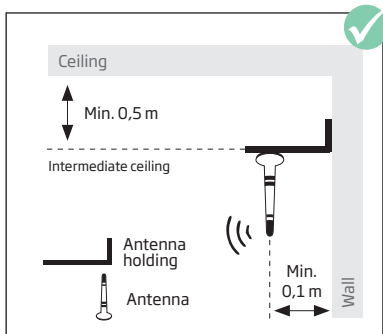
- The angle at which the transmitted signal hits the wall is very important. The effective wall thickness - and with it the signal attenuation - varies according to this angle. Signals should be transmitted as directly as possible through the wall.



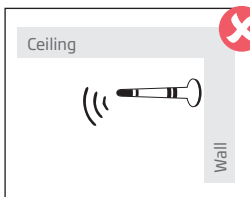
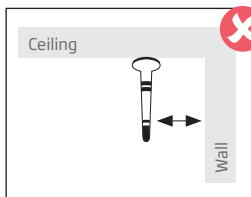
- When using devices with an internal receiving antenna, the device should not be installed on the same side of the wall as the transmitter. Near a wall, the radio waves are likely to be subject to interfering dispersions or reflections. Consequently, the position of the antenna has to be on the opposite or connecting wall.



- When using Central Panel with an external antenna, the ideal antenna installation place is a central location in the room. Where possible the antenna should be at least 10 - 15 cm away from the wall corner or concrete ceiling.

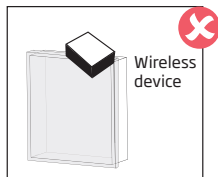
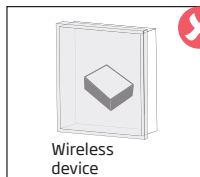
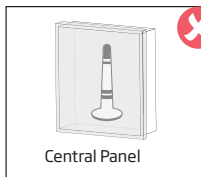


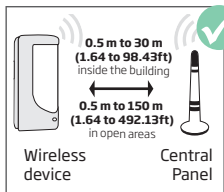
- Wrong antenna mounting by the ceiling:



- Massive objects made of metal, such as metallic separation walls and metal inserted ceilings, massive wall reinforcements and the metal foil of heat insulations, reflect electromagnetic waves and thus create what is known as radio shadow. However singularized small metal studs, e.g. the metal studs of a gypsum dry wall, don't show a recognizable screening.

- Internal antenna, mounted on metal surfaces (typically 30% loss of range)
- Using any type of antenna inside metallic frames (typically 30% loss of range)

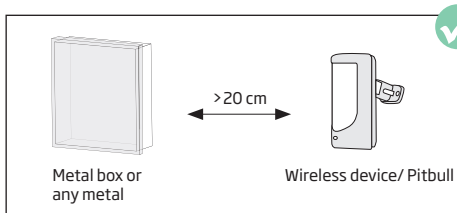




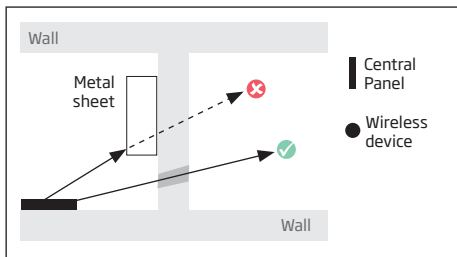
#### Recommended installation:

- face the front side of the wireless device towards the antenna
- keep the distance: 0,5 to 30m (1.64 to 98.43ft) inside the building, 0,5 to 150m (1.64 to 492.13ft) in open areas

- Keep the distance of at least 20cm (7.87in) or more between your wireless device/Pitbull and the metal box/metal sheet or any object of this material:



- Metal separation walls: It can be noticed that radio transmission even works with metal indoor separation walls. This happens through reflections: Walls made of metal or concrete reflect the electromagnetic waves. The radio waves reach the next room or floor via a non metallic opening.



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