WiSH Sensor Best Practices

The Wireless Sensor Hub (WiSH) is a wireless hub that is used exclusively to transmit sensor data from internal and connected sensors back to the Room Alert 26W hardware unit. Because the WiSH sensor is wireless and battery powered, it can be located anywhere monitoring is desired up to 250 feet from the main unit without running cables. The WiSH sensor communicates directly with the Room Alert 26W via a secure, private protocol on a ZigBee based 2.4 Ghz wireless connection. Data sent and received is encrypted and will not interfere with other wireless devices in the environment.

Antenna Orientation

The Room Alert 26W ships with an external antenna that can be positioned either horizontally or vertically. The WiSH sensor has an internal antenna that is positioned parallel to the sensor cover (see Figure 1). The orientation of both the Room Alert 26W antenna and WiSH sensor antenna has a major impact on the effective range of the wireless signal. When positioning an antenna, it important to be sure the antenna is as far away from metal objects as possible. If metal is too close to an antenna, it can interfere with the way the antenna radiates the signal and can cause undesirable results. It is best to provide at least several inches of separation between the antenna and other metal objects. This applies for the internal antenna on the WiSH Sensor as well.

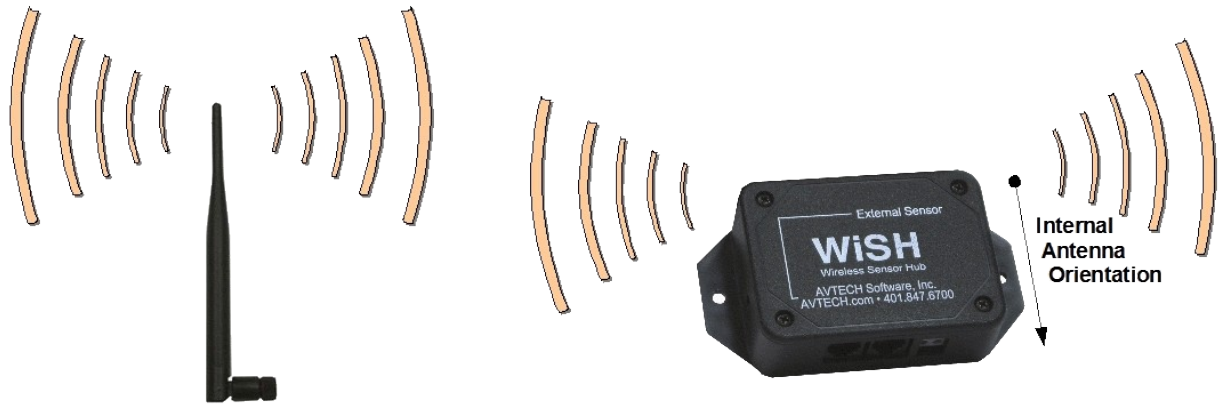

Figure 1: Antenna Orientation

Room Alert 26W Antenna

Depending on the physical layout of the Room Alert 26W and WiSH Sensors, the external antenna on the Room Alert 26W can be oriented in various positions to maximize the effective range of the sensors. If the sensors are placed in a building with most sensors located on the same floor or at the same level as the Room Alert 26W, the antenna should be positioned vertically for best results. If the WiSH Sensors are located on different floors or distributed above and below the Room Alert 26W, the antenna should be positioned horizontally for best results. To best understand this behavior, visualize an invisible flat 'donut' shape with the top of the antenna at the center as illustrated in Figure 2.

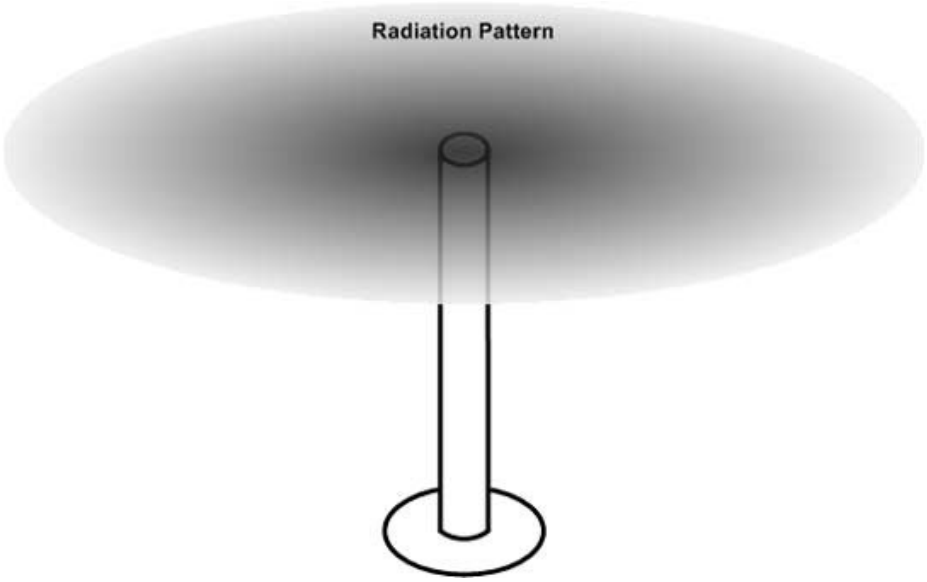

Figure 2: Wireless Signal Radiation Pattern

WiSH Sensor Antenna

The internal antenna on the WiSH Sensor is positioned parallel to the cover and is designed to be vertical when the sensor is mounted on the wall. The orientation on the internal antenna can be modified by changing the mounting or positioning of the WiSH Sensor. Like the antenna on the Room Alert 26W, the position of the antenna has a major impact on the effective range of the wireless signal and the WiSH Sensors should be mounted to match the position of the Room Alert 26W antenna.

If the Room Alert 26W antenna is positioned vertically, the WiSH Sensors should be mounted on a wall with the label facing the Room Alert 26W. If possible, the WiSH Sensors should be located on the top half of the wall to avoid obstacles such as people, desks, cabinets and other objects that could reduce the range of the wireless signal. If the ceiling height is 8 feet, the optimum height for mounting the WiSH Sensor is 6 feet up the wall.

If the Room Alert 26W antenna is positioned horizontally, the WiSH Sensors should be mounted horizontally with the label facing the Room Alert 26W. When WiSH Sensors are located above or below the Room Alert 26W (i.e. On different floors of a building), care should be taken to place the WiSH Sensors as close as possible to directly above or below the Room Alert 26W for the most effective vertical wireless range.

Obstructions

With a clear line of sight from the Room Alert 26W to the WiSH Sensor, the wireless range can be up to 250 feet. However, each obstacle between the Room Alert 26W and WiSH Sensor reduces the effective range of the wireless signal. Obvious obstacles include brick walls, drywall, doors, floors and ceilings. Other obstacles that might not be as obvious include people, desks, bookshelves, cabinets, wind, plants or trees and more. Each of these obstacles will reduce the effective range of the wireless

signal if they are between the Room Alert 26W and WiSH Sensors. Table 1 lists common obstacles and the approximate effect on the wireless signal range.

Obstruction	***Effect On Range (feet)***
Brick Wall	40-50'
Drywall Wall (Steel Studs)	15-25'
Drywall Wall (Wood Studs)	10-20'
Door (Solid Core)	10-12'
Door (Hollow Core)	5-7'
Cubicle Wall	3-5'
People	1-3'

Table 1: Obstructions Effect On Range

To determine the maximum effective wireless range in your environment, make a list of the number and types of obstructions between the Room Alert 26W and WiSH Sensor. Starting with 250 feet, subtract the maximum number from the table above for each of the obstructions. If the resulting number is less than the distance from the Room Alert 26W to the WiSH Sensor, relocate the WiSH Sensor so it is within the maximum effective range.

For example, if the WiSH Sensor is located 125 feet from the Room Alert 26W and there is one brick wall, two drywall walls and three solid core doors between the units, the maximum effective range would be 114 feet (250 – (1 x 50) – (2 x 25) – (3 x 12) = 114). In this case, the WiSH Sensor should be moved closer to the Room Alert 26W so it is within the 114 foot effective range. Sometimes this could mean simply moving the sensor to the opposite wall in the room.

Conclusion

The wireless capabilities of Room Alert 26W and WiSH Sensors allow monitoring of locations where running cables is not desired or not possible. However, care must be taken during installation and setup to be sure the positioning of the Room Alert 26W and WiSH Sensors maximizes the effective range and reliability of the solution. Using the recommendations described above will result in a highly reliable and effective wireless monitoring solution.