A Few Words About Optimum Sensor Reception

We have built and deployed several SIS systems in real world environments. We have found that sensor reception can vary dramatically in different deployments. For example:

- When the sensors are only 10 feet from the SIS receivers, the reception is excellent.
- In a modern three floor townhouse an SIS on the second floor is able to reliably receive codes from sensors that are 30 feet away, through floors and walls.
- In a c1916 home the SIS was unable to reliably receive codes from sensors that are just 20 feet away, through one wall.
- In one open living room situation, an SIS was unable to receive codes from sensors that were 20 feet away with a clear line of sight. In another, very similar installation, reception was found to be reliable.

The biggest learning is that you cannot compensate for all conditions. This is the inherent cost of cheap:

- The 315 and 433 MHz bands have a lot of ambient noise.
- The modulation scheme (OOK) is inherently susceptible to noise. FSK is much better for range, but is not available in the cheap sensors we have found.
- The protocol used by these sensors is not designed to make best use of the modulation scheme, the receiver hardware, or assure that the data is received and decoded correctly.

We have learned a few things, and as the project team learns more, we will update this document. Here are the most current recommendations:

1. Place the SIS hub in the middle of your sensor layout. Try to minimize the distance between the SIS hub and each sensor as best you can.
2. Do not place the receivers on the SIS circuit board. There is some interfering signal generated by the SIS photon and USB. Your receivers should be placed off the SIS PCB; 6 inches seems to be enough.
3. Your receivers should be mounted with an edge of the receiver PCB toward the floor. Having the flat side of the receiver PCB parallel to the floor limits reception.
4. As the batteries in the sensors wear out, we believe the sensors send out fewer code sets and will transmit with less power. Keep your sensor batteries fresh.