

## Wireless Coverage with AP in Non-Metallic NEMA 4 Enclosure

5/25/2016

### **Question: Do Oberon's non-metallic NEMA 4 wireless access point enclosures affect wireless coverage?**

Oberon's NEMA-4 wireless access point enclosures are polycarbonate or polycarbonate blend plastic construction. This construction is very strong and resists weathering and sun. Polycarbonates, like most plastics, do not absorb or reflect Radio Frequency (RF) signals very strongly. The walls of this enclosure are only 1/10 of an inch thick (0.10"), so that they are virtually transparent to the wireless access point's (WAPs) wireless signals.

To verify this transparency, Oberon engineers performed a "site survey" comparing coverage of a WAP without an enclosure, versus a WAP inside an Oberon NEMA 4 enclosure.

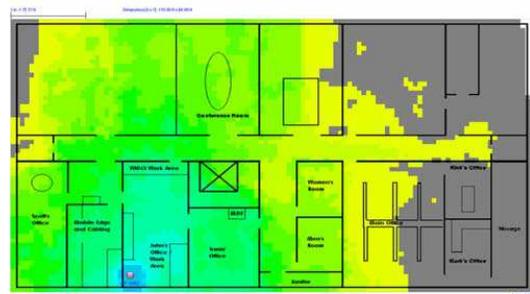
This site survey was performed using a Cisco 1250 series WAP with "rubber duck" style dipole antennas attached to the access point. The WAP was set to operate in the 802.11n mode, in the 5 GHz band. The WAP was also configured to transmit in a channel-bonded mode (40 MHz channels). This is believed to be a worst case scenario, as loss in the enclosure will be less at 2.4 GHz.

The site survey is performed using AirMagnet wireless LAN survey software. A wireless LAN adapter in a mobile laptop is associated with the access point and walked through the coverage environment. The survey environment is a 4,000 sq. ft. office/lab area with many walls, and steel wall joists, doors, cubicles, dividers and cabinets. The software records received signal strength (RSS) throughout the office environment, and generates heat maps indicating the RSS at the client device. The location of the WAP can be seen in the lower left corner of the heat map. The software is set-up to truncate the heat map when the RSS drops below a -75 dBm

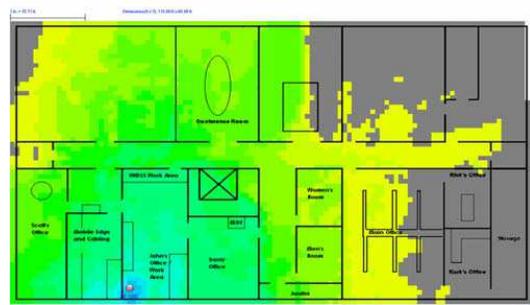
fringe. The gray area in the heat maps indicates where RF signal strength is below the desired -75 dBm.

In both cases- without an enclosure and within the enclosure, the WAP covers approximately ¾ of the office space (about 3,000 sq. ft.). This is typical coverage at 5 GHz in this type of office/ lab area. The heat map indicates there is *very little difference in coverage between the enclosed and un-enclosed WAP.*

Oberon's polycarbonate NEMA-4 enclosures are paintable, and most paints will have very little effect on the RF signal. Metallic and graphite loaded paints may have an effect and should be tested. The WAP should be placed near the center of the enclosure so that the antennas do not touch the sidewalls. If the antennas are touching the sidewalls, the antenna pattern may be affected.



**Site survey coverage: NO Enclosure**



**Site Survey Coverage: WAP inside Oberon non-metallic NEMA 4 enclosure**