APPLICATION NOTE

A division of Chatsworth Products

Radio Frequency (RF) Signal loss through Oberon® Model 3030 Fiberglass and Model 3032 Polyethylene Bollards

INTRODUCTION

Oberon's Netpoint™ Model 3030 Fiberglass and Model 3032 Polyethylene Wireless Bollards are ideal for extending wireless and Wi-Fi coverage into open public spaces such as parks, outdoor malls, and bus stops. The wireless bollard can be used to mount the Wi-Fi AP in locations where Wi-Fi coverage is most needed and avoid the need to mount on buildings or light poles. These rugged bollards are weather-proof and tamper resistant, and are designed to protect wireless equipment in open public areas. These bollards are large enough for outdoor APs, omni-directional and directional antennas, and small network switches from most vendors.

Wi-Fi BOLLARDS

Oberon's model 3030 Wi-Fi bollards are constructed of a heavy duty, 0.25 inch thick, resin transfer molded fiberglass composite (65% glass, 35% resin). Fiberglass, like its' glass and resin constituents, is considered to be low Radio Frequency (RF) loss material. It does not have reflective or absorptive properties. (Certain types of glass used in building construction, such as low emissivity glass, or E-glass, is very reflective, and is problematic for radio frequency signals. But the glass used in fiberglass is not "E-glass"). The fiberglass is painted with a low loss, UV resistant paint.

The Model 3032 Wi-Fi bollard is formed from a low RF loss, roto-molded MDPE (Polyethylene) resin with color embedded in the plastic. Plastics, in general, are low loss materials from a signal transmission standpoint. Polyethylene, in particular, has a low dielectric constant and is low loss.

Availability: US, Canada, Latin America, Europe, Middle East & Africa

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TEST SET-UP

In order to verify the low RF signal loss though each of the Wi-Fi bollards, a test setup was created to measure signal loss through each style. The test set-up is comprised of a Cisco 2800 Wi-Fi access point mounted on the Model 3032 or 3030 equipment stand, and a Dell laptop client device with WiFiInfoView installed to report the Received Signal Strength Indication (RSSI). WiFiInfoView communicates with the 802.11ac enabled device to report the signal strength information in two bands. The testing is performed with the AP and Client devices separated by 30 feet.

MEASUREMENT

40 individual measurements of the RSSI at the client device were collected at both 2.4 GHz and 5.3 GHz, with the bollards removed from the equipment stand ("Bollard off"), then with the bollards returned to the equipment stand and covering the AP ("Bollard on"). When the bollard was on, it was rotated 90 degrees every ten measurements to account for potential variations in loss from azimuth position.

OBERON MODEL 3030 FIBERGLASS BOLLARD

The Model 3030 bollard is constructed with low loss fiberglass material, and the paint is a non-metallic, non-conductive outdoor paint with low loss characteristics. On the interior of the bollard, a fiberglass pole is used to support APs and antennas. The fiberglass pole will minimize the impact on AP and antenna patterns.

For the model 3030 fiberglass bollard, the measured results are consistent with literature reports, wherein the RF loss at 5.3GHz is 2.3 dB, and at 2.4 GHz is 0.9 dB. For wireless design purposes, It may be prudent to perform the wireless site survey with the AP in the bollard, or perhaps lowering the AP power by 2 or 3 dB, to emulate the loss with the AP or antenna being inside the fiberglass bollard.

Measurement	Band	Band
	2.5 GHz	5.3 GHz
RSSI, Bollard off, avg. of 40 measurements	-46.1 dBm	-54.8 dBm
RSSI, Bollard on, avg. of 40 measurements at 4 angles	-47.0 dBm	-57.1 dBm
RF Signal loss through bollard	**0.9 dB**	**2.3 dB**

OBERON MODEL 3032 POLYETHYLENE BOLLARD

The RF Signal loss through the Model 3032 Polyethylene plastic is very low (<1 dB), in both the 2.5 and 5.3 GHz band, and may be difficult to discern in practice. For wireless design purposes, it may not be necessary to make adjustments in the placement of access points or power settings due to the low signal loss through the bollard.

Measurement	Band	Band
	2.5 GHz	5.3 GHz
RSSI, Bollard off, avg. of 40 measurements	-42.8 dBm	-52.3 dBm
RSSI, Bollard on, avg. of 40 measurements at 4 angles	-42.9 dBm	53.0 dBm
RF Signal loss through bollard	**0.1 dB**	**0.7 dB**

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