

TECH NOTES

Enclosure Temperature Rise

Solar Absorption:

There has been some talk about enclosure color versus internal temperature rise due to the effects of the sun. We decided to test the effects on our RooTenna14 radio compartment antenna product.

Two enclosures were placed side by side directly facing the sun. One enclosure was white color and the other enclosure was the standard RooTenna light gray color.

Ambient (shade) temperature was 88 deg F (31 deg C), elevation 5110 feet (1558 meters) above sea level.

The enclosures were left to stabilize in the sun for 1 hour.

Results:

White Enclosure: Internal Temperature was +5-7 deg F (+3-4 deg C) above ambient

Standard Gray Enclosure: Internal Temperature was 12-14 deg F (+7-8 deg C) above ambient

Conclusion: While the +7-8 degree temperature rise in most climates would not be significant, there are some climates or installations where the installer may want to consider using a white color housing to decrease the solar absorption. For this reason, Pacific Wireless will offer a white color housing as an option.

Internal Heating:

Other factors that affect internal temperature are the heating caused by heat dissipation of the radio equipment. As part of our design work on the RooTenna14 radio compartment enclosure we calculated the internal temperature rise of a couple popular radio boards housed in a RooTenna radio compartment antenna.

The formula used is: $DT^F = 4.08 (Q/A) + 1.1$

Temperature Rise in Degrees F = 4.08 (heat dissipation in watts / surface area in Sq Ft) + 1.1

RooTenna14 surface area: RT14 = **1.92 FT²**; RTL14 = **1.6 FT²**

Heat dissipation of radio Equipment: CB3 **1.7W**; Generic 250mW card **3.15W**

Results:

Pacific Wireless Model	Radio Type	Temperature Rise (Deg F)
RooTenna (RT14)	CB3	4.7
	250mW Generic	7.8
RooTenna Low Profile (RTL14)	CB3	5.4
	250mW Generic	9.1

Conclusion: Internal heating by low wattage transceivers such as those used in 802.11b equipment doesn't add significant internal heating when used in a RooTenna enclosure.