Install the RFS

Check all regulatory standards (refer to Chapter 1, Page 8 "Regulatory Information") prior to installation. Now that the BTS is in place, the RFS is readied for installation. Follow the Panel or Omni Antenna information and procedures below. Reference the specifications in Appendix H.

Panel Antenna

The RFS Panel antenna is installed on a structure, such as a tower or a pole, which is defined in the site survey and design. Following are the steps to complete the installation of the panel antenna.

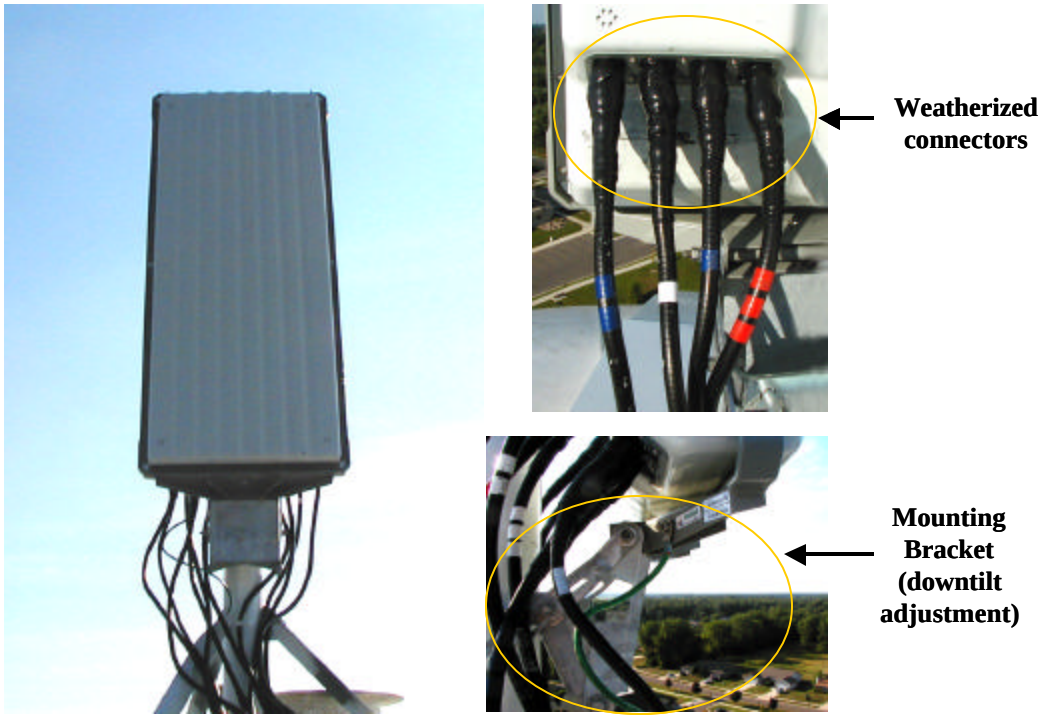
Verify RFS Operation

Verify proper operation of the RFS *before* installation. Test the transmit and receive path of each antenna in the RFS per Appendix S, and using the RFS System Test Form in Appendix O.

Set the Downtilt

Check the engineering study for the required downtilt of the antenna. The panel antenna has 6^{o} of fixed electrical downtilt but it can be mechanically adjusted for an uptilt of 0 to 10^{o}. As a result, the main lobe of the beam can be pointed between 4 degrees above and 6 degrees below the horizon.

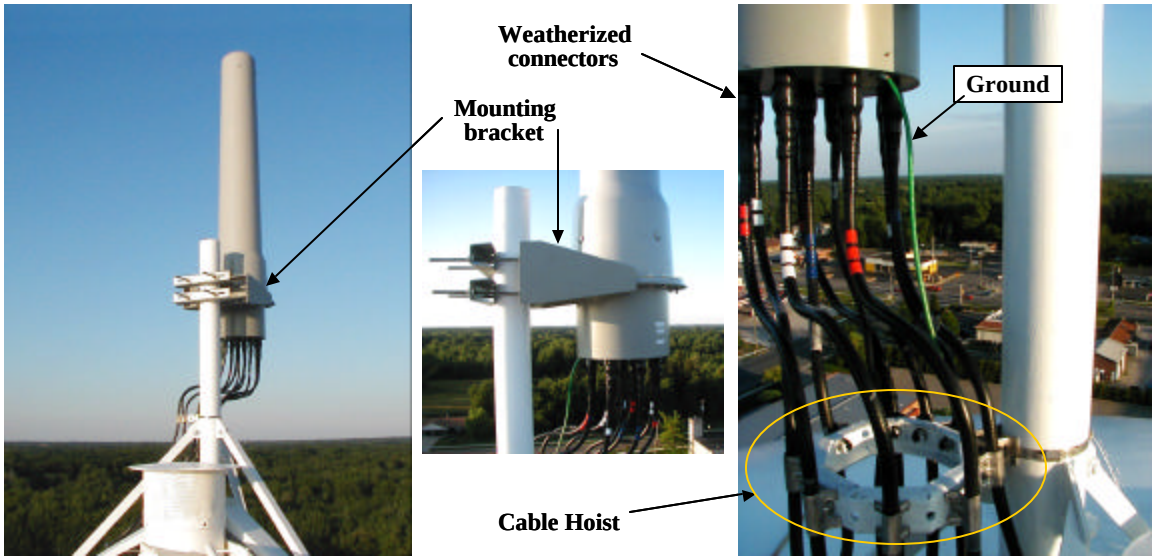
Figure 28: Panel Antenna Elements



Omni Antenna

An Omni antenna has 2 degrees of fixed electrical downtilt

Figure 29: Omni Antenna Elements



Set the Azimuth

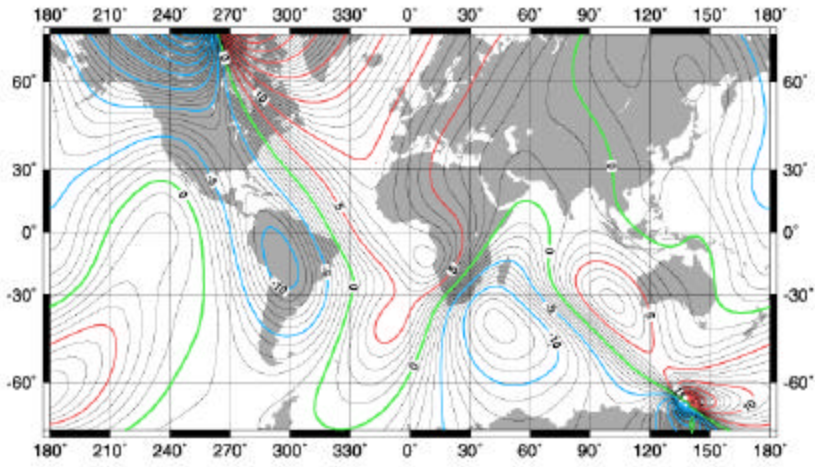
Position the RFS on the mounting pole or structure, ensuring that the antenna is pointing in the proper azimuth direction determined by the engineering study. For an omni, the first antenna element must face East (Figure 30).

Figure 30: Bottom of an Omni Antenna Showing Correct Orientation

The azimuth direction is stated in degrees from true North. Use the diagram shown in Figure 31 to determine the declination angle for your location. Add or subtract the declination angle from magnetic North to obtain true North.

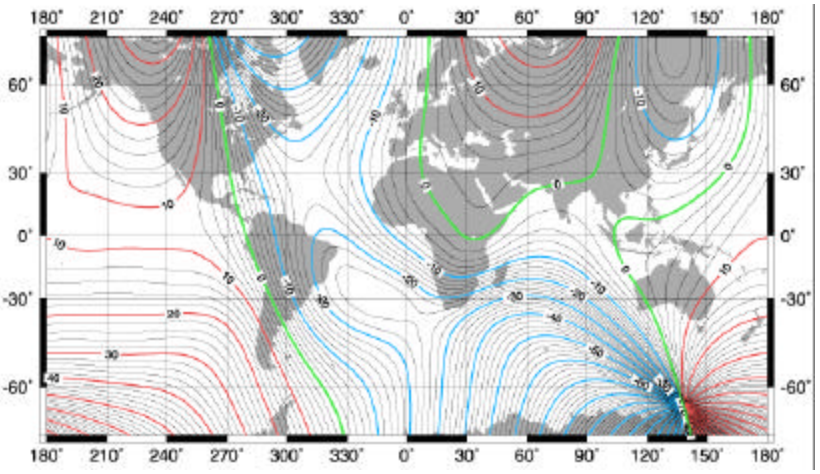
Tighten the four nuts on each of the two antenna mounting brackets to secure the RFS to the mounting pole. Use a compass to check the direction from the center of the panel (this is magnetic North). Be sure that you are using a compass calibrated for the geographical region where you are. There are five such regions and a compass calibrated for one of them will not work properly in the others.

Figure 31: Declination Angle in Degrees (Year 2000)



Since this is not the year 2000 anymore, you will want to check this reference map to learn how your magnetic declination shifts from year to year. Notice that the map measures annual shifts in minutes. Since it takes 60 minutes to equal 1 degree, if you notice that your location has a declination shift of 5 minutes per year, this means it will be another 12 years before your declination adjustment changes by one whole degree. The following web site provides more details on how to use these charts: **http://www.thecompassstore.com/decvar.html**

Figure 31a: Annual Change in Magnetic Declination



Verify the Downtilt

Using an inclinometer (Figure 32), check the downtilt of the RFS antenna. If required, adjust the angle using the downtilt adjustment brackets. Be sure to include any electrical uptilt or downtilt built into the antenna in the setting.

Tighten the mounting hardware to secure the RFS in the proper position. Recheck the downtilt angle again to verify proper position. Repeat the procedure for all other antennas that are installed in the system. Ensure that they are mounted in the proper direction and with the correct downtilt angle.

Figure 32: Measuring Antenna Downtilt

For accurate results, align the inclinometer against the metal frame on the side of the panel antenna, which is guaranteed to be parallel to the antenna elements

Install Surge Protectors

If lightning protection is required, as determined by the customer, the power/data lightning arrestors must comply with UL497. Cables, such as the RF and power/data cables, in excess of 140 feet in length must have protective devices installed that are UL497A or UL497B listed.