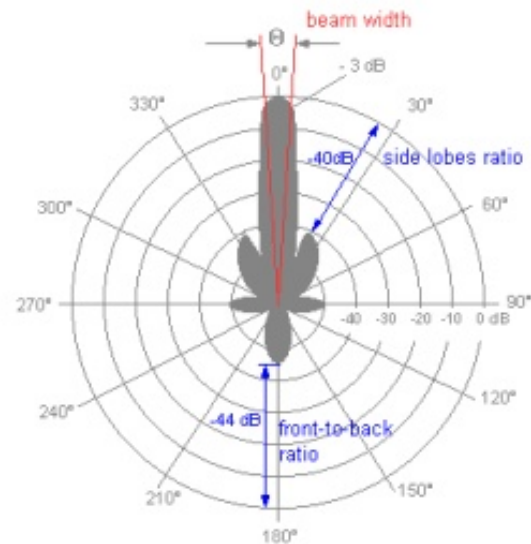
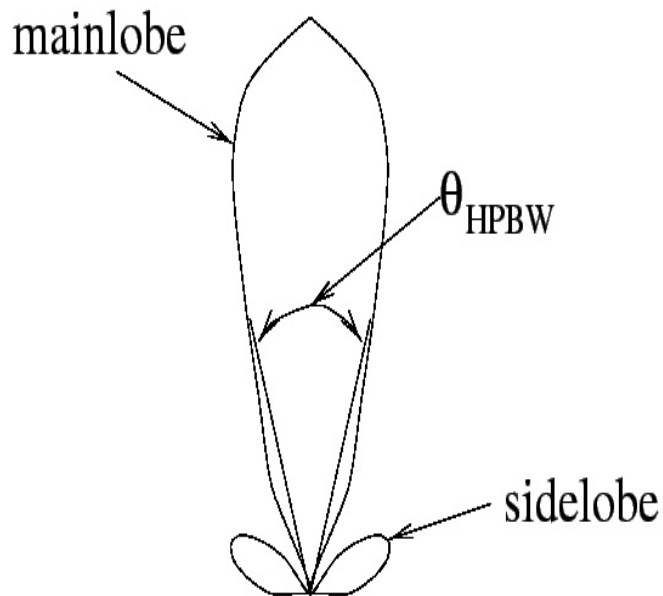


Increasing Directivity in Parabolic Antennas

Problem

With the increasing importance of communications and proliferation of masts it is imperative that communication antennas are more directive (eg: propagate the highest percentage of power in the required direction). The effect of sidelobes on a receive antenna can cause it to become vulnerable to antenna noise from stray signals outside the main source. While with transmit antennas, sidelobes can cause an antenna to broadcast with a lesser degree of accuracy, compromising security as an unintended receiver may pick up sensitive communications elsewhere. Therefore, extraneous signals such as side lobes must be minimized.



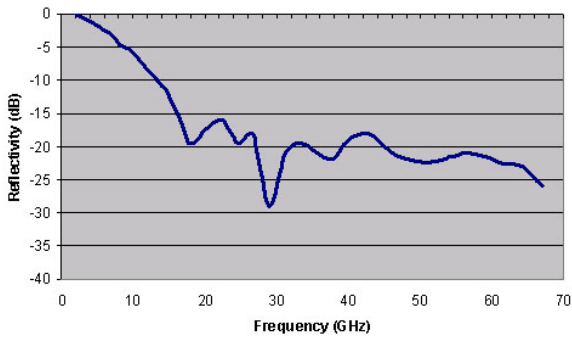
By reducing an antennas side lobes this ensures that the transmit antenna “talks” to its receiving “brother” with clarity and while not interfering with other antennas on the same mast or with others within its range.

Solution

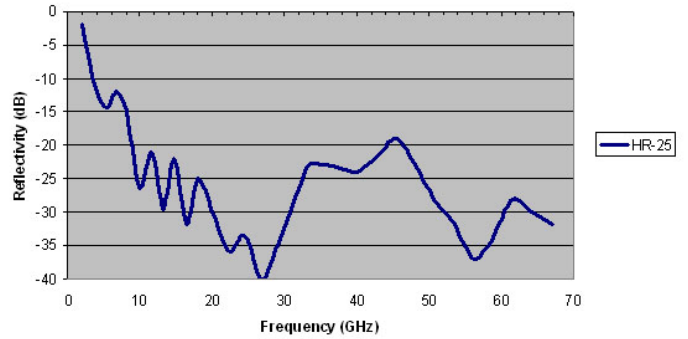
A simple way of increasing directivity is to fit a short metallic shield around the periphery of the dish eliminating any sidelobes. However, this immediate solution has a detrimental effect on the overall performance due to multiple reflections caused from the shield itself.

The simple solution to this problem is to fit an absorbing material such as ECCOSORB® HR on the inside of the shield to eliminate any reflections. Typical reflectivity curves for ECCOSORB® HR-10 (10mm) and ECCOSORB® HR-25 (25mm) are given below.

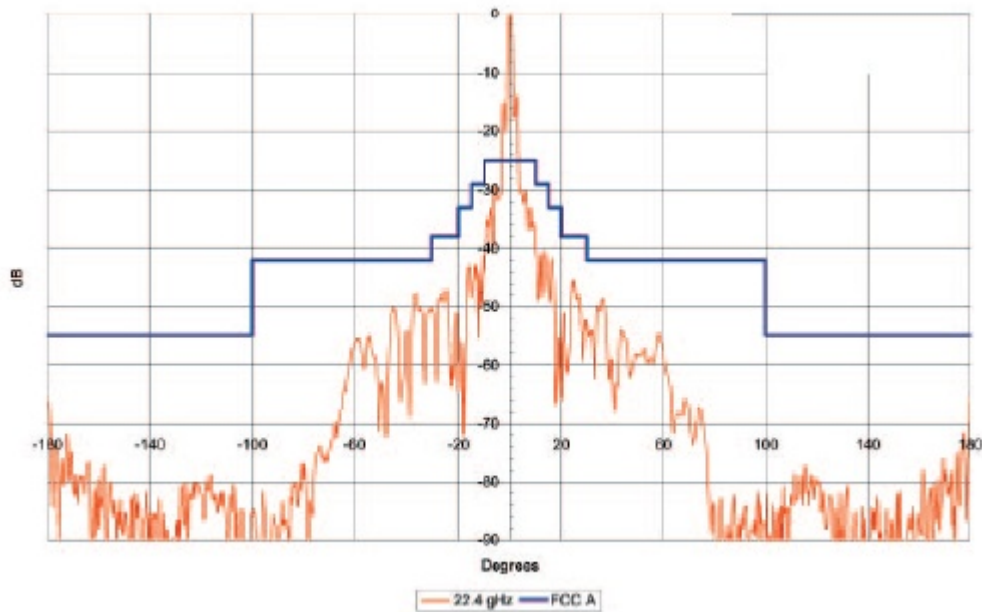
HR-10 Reflectivity



HR-25 Reflectivity



ECCOSORB® HR is a reticulated polyurethane foam with a controlled conductivity carbon gradient that provides antenna engineers with a lightweight, cost effective solution to the directivity and performance problems. The below plot shows where the side lobes (-20 to -60 and 20 to 60) have been reduced with **ECCOSORB®** by an average of 10 dB ensuring the pattern is within regulations.



Application

During assembly **ECCOSORB® HR** is either glued or attached with plastic fasteners to the inside vertical walls of the metal radome (Fig. 1). If gluing is the desired means of attachment, **ECCOSTOCK® 13-111-NF**, a contact cement sold by Emerson & Cuming Microwave Products is the suggested adhesive for this type of foam. Note that since **ECCOSORB® HR** is a gradient loaded absorber, there is a definitive front and back, of which the back (greatest amount of carbon) must be attached to the metal surface for optimal performance.

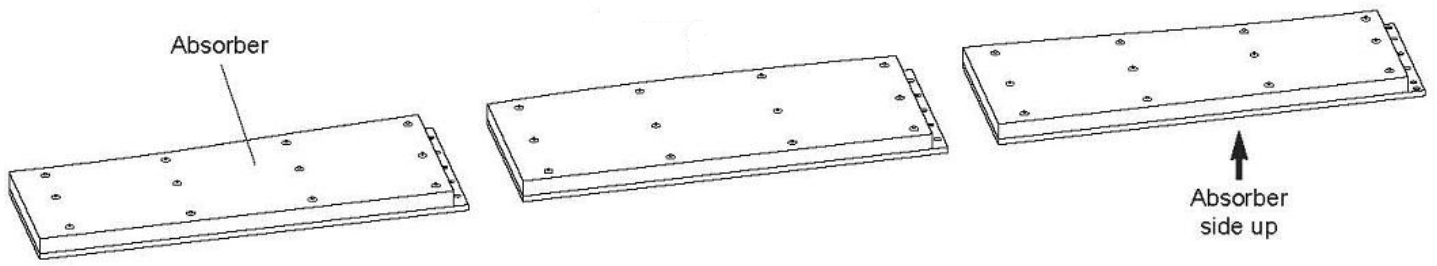


Figure 1

Below in figure 2 the metal shield is assembled with the absorber before being mounted to the reflector. In some instances depending on the antenna manufacturer this shield may or may not be one solid metal unit.

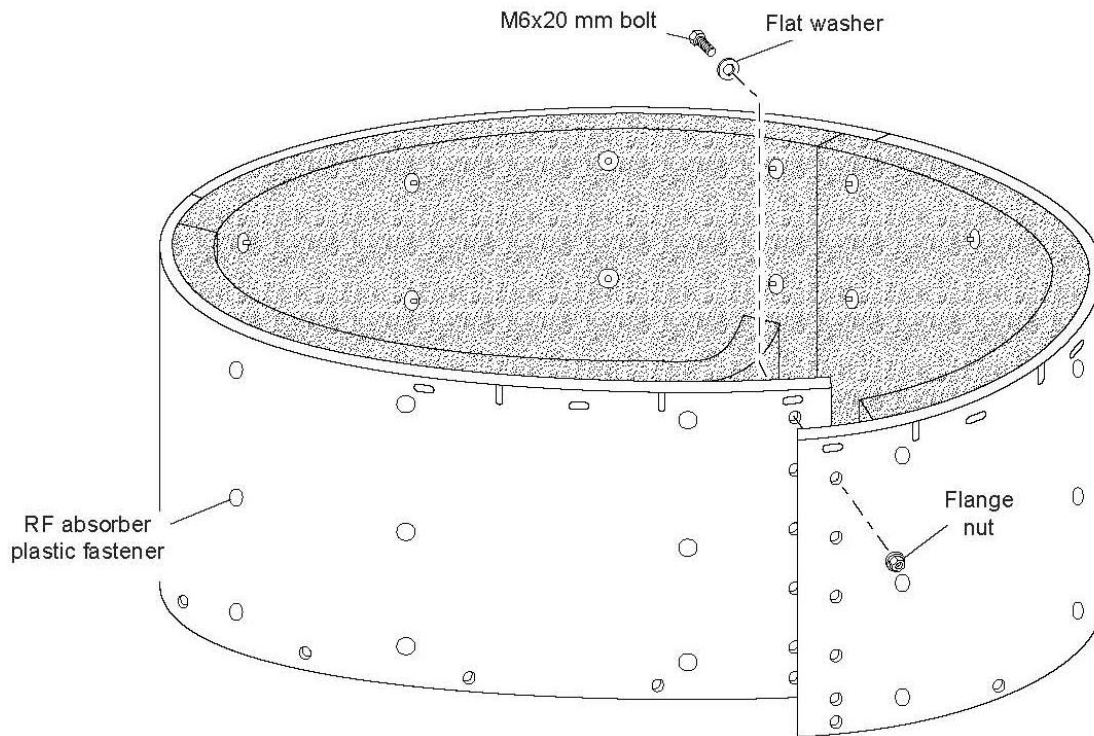


Figure 2

The antenna shield is then assembled with the front of the absorber facing inward towards the antenna (Fig. 2) before being fitted to the reflector (Fig. 3).

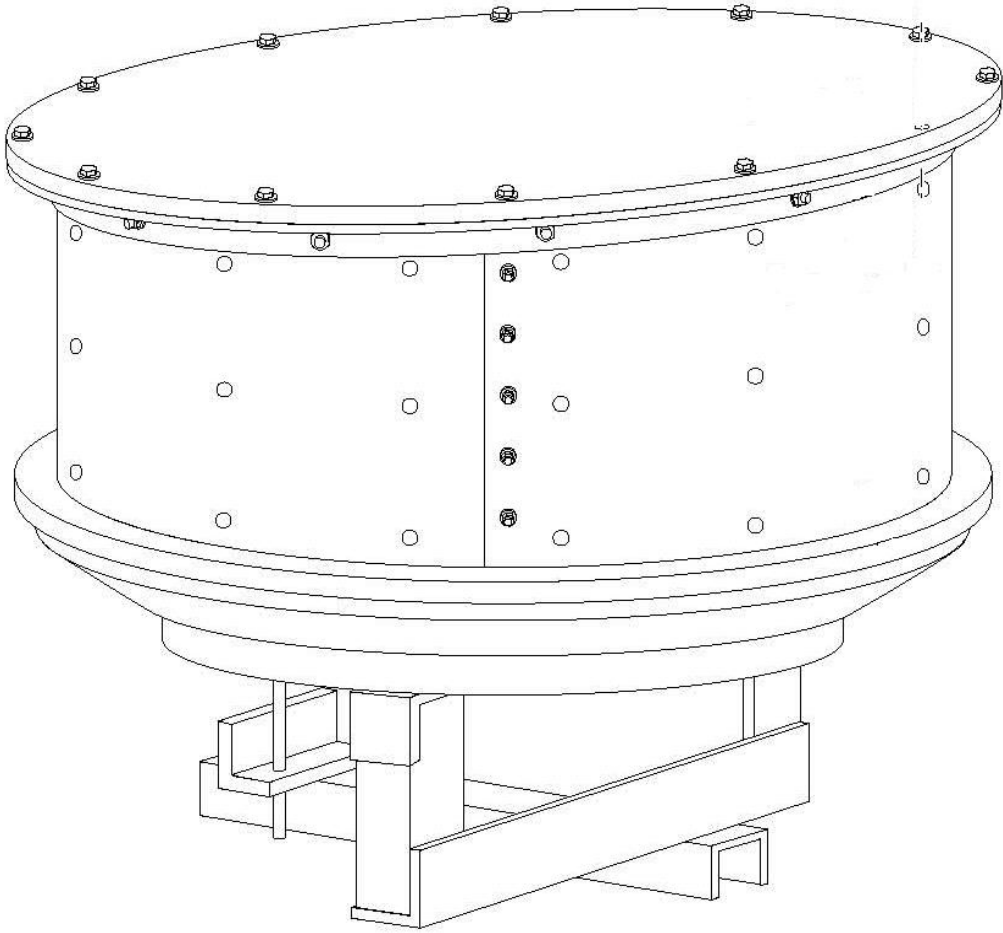


Figure 3

Fully assembled unit

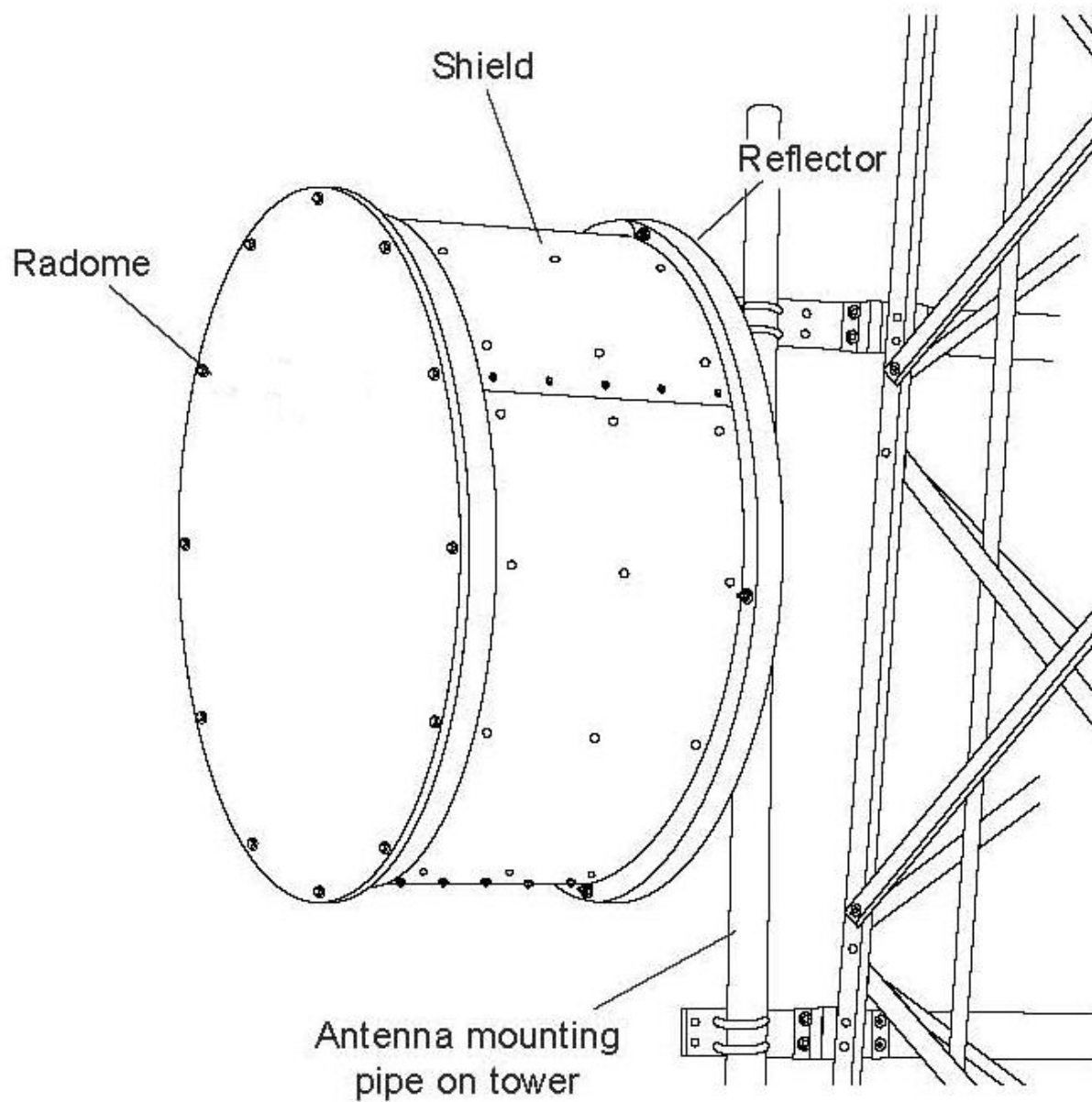


Figure 4

The final assembly can then be mounted and is ready for use