Dish Size versus EIRP

Peter Miller

You do not have to be a real satellite DX-er to ask yourself a question: "can I receive this or that transponder from this or that satellite in my location?". If only you decide to install a motorized dish, this question immediately becomes very important to you. Your antenna will be receiving signals from many satellites, and while some of them will be very easy to receive, the others will be difficult or even impossible to read. Inevitably, you will start studying the footprints of various satellites and satellite beams. And very soon will you discover that some footprints show the minimum dish diameter required for reception, but the others show something called EIRP, usually expressed in dBW (see SatcoDX coverage maps for examples of this type).

EIRP means Effective Isotropic Radiated Power and is the product of the transponder power and its antenna gain coefficient (P x G). The higher EIRP, the stronger signal reaching your dish and the smaller dish required to receive it. If the beam footprint is small, the antenna gain coefficient is large and EIRP is big. For very wide beams, G is small and also EIRP can not be high. EIRP can be translated to the dish size as you can see in figures 1 through 3. Figure 3 is an enlarged part of figure 2 to make it easier for you to find the dish size for the most commonly used dish sizes for Ku-Band.

The graphs shown in the figures, assume 20° LNB for C-Band and an LNB with NF=0.6 dB for Ku-Band. Should you have better equipment, for example universal 0.3 dB LNB for Ku-Band, you may decrease the requirements for the dish size by a few percent. For example, you may expect that for EIRP=48 dBW, instead of 70 cm dish with 0.6 dB LNB, you can successfully use 65 cm dish with 0.3 dB LNB.

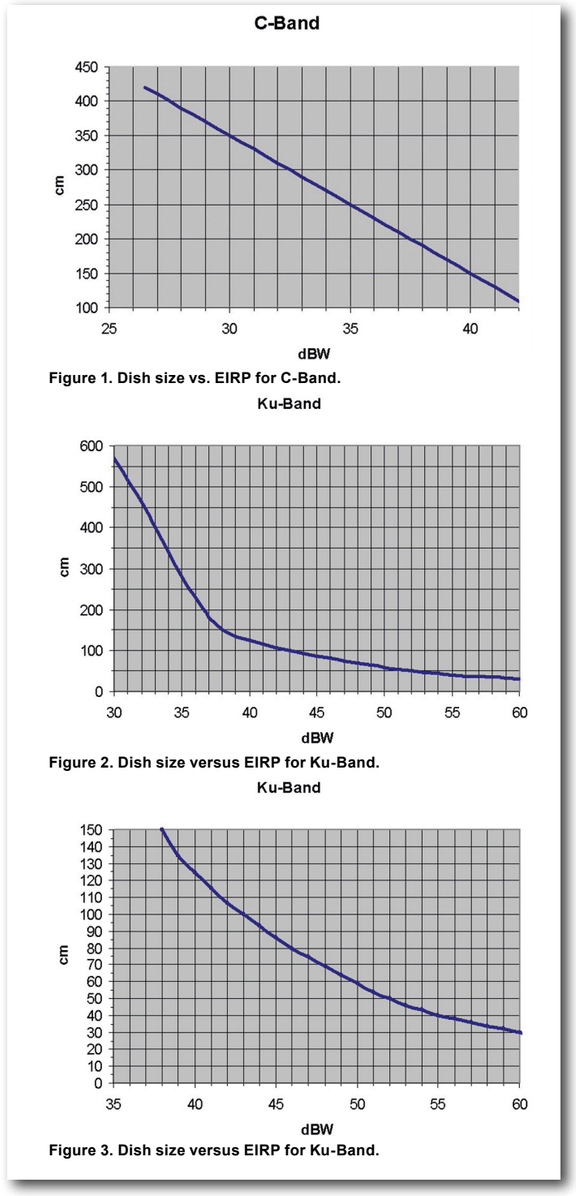

Figure 1. Dish size vs. EIRP for C-Band.

Figure 2. Dish size versus EIRP for Ku-Band.

Figure 3. Dish size versus EIRP for Ku-Band.

Occasionally, we hear that somebody receives signal with a smaller dish than the one shown in the graph for a given EIRP. It can happen if the satellite transmits somewhat stronger signal than promised in its specification. So, do not jump into conclusion that something is wrong with the graphs.