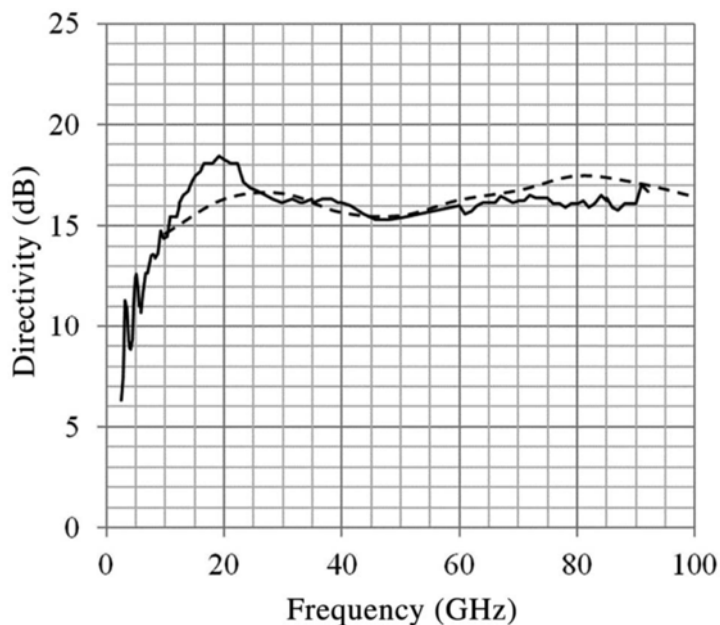




10-100 GHz Double-Ridged Horn Antenna with Integrated Waveguide Coax Launcher

Advantages of the NRAO Double-Ridged Horn Antenna (Patent Pending)

- Minimizes the spreading inductance in the launcher to achieve 15 dB return loss
- Works well over a 10:1 bandwidth
- Unique horn profile ensures monotonically varying cutoff frequencies to prevent the appearance of trapped mode resonances
- Nearly constant beamwidth in both E- and H-planes for overall directivity of 16.5 dB between 10 and 100 GHz
- Launcher design and fabrication suitable for scaling up in frequency to the sub-millimeter wave band



Graph showing modeled (dashes) and measured (solid line) directivity of 10-100 GHz Double-Ridged Horn antenna



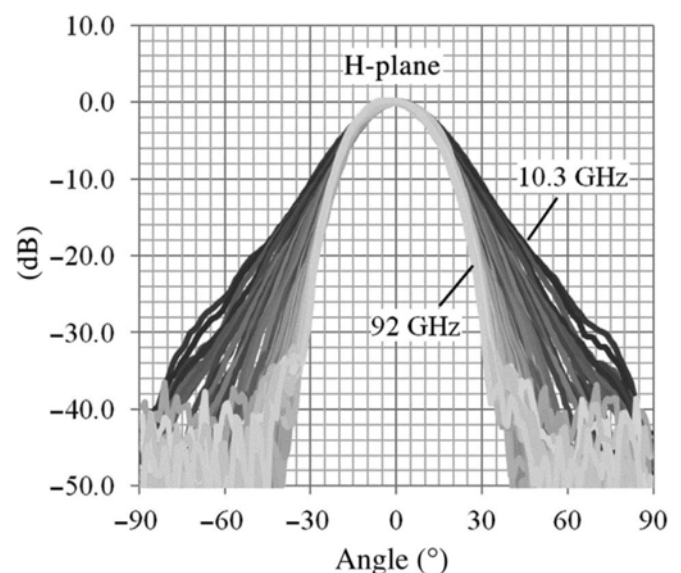
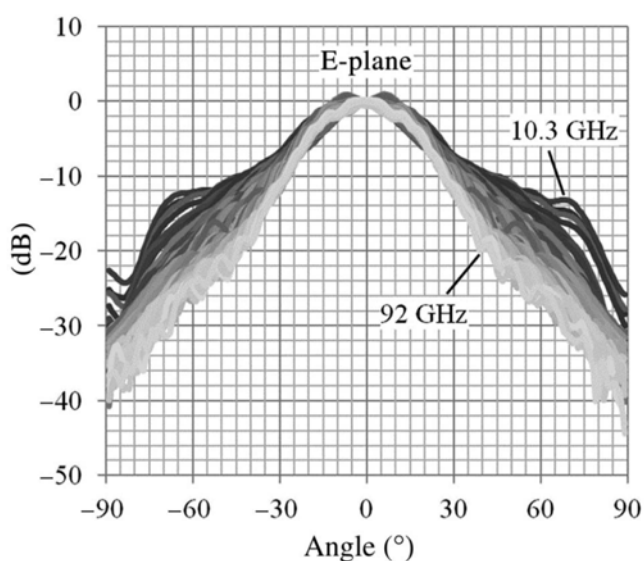
Image of a Double-Ridged Horn Antenna operating in the 10-100 GHz frequency range



Background

Broadband, single-polarization horn antennas are of significant interest in a number of test and measurement applications, and many successful designs based on double-ridged geometry have been demonstrated in the cm-wave frequency band. Horns up to 18 GHz are especially common and readily available for purchase from commercial vendors. Very few such broadband horns, however, have extended much into the millimeter-wave range, though some have been reported and are even commercially available at frequencies up to about 40 GHz.

The NRAO double-ridged horn antenna design has been fabricated and tested to show good return loss and near-constant beamwidth covering 10–100 GHz. This is believed to be the highest operating frequency for a decade-bandwidth horn reported to date. It is enabled in part by a novel coax to double-ridged waveguide launcher which is incorporated into the design on the back of the antenna.



Measured E-Plane and H-Plane beam patterns for the 10-100 GHz NRAO Double-Ridged Horn Antenna

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