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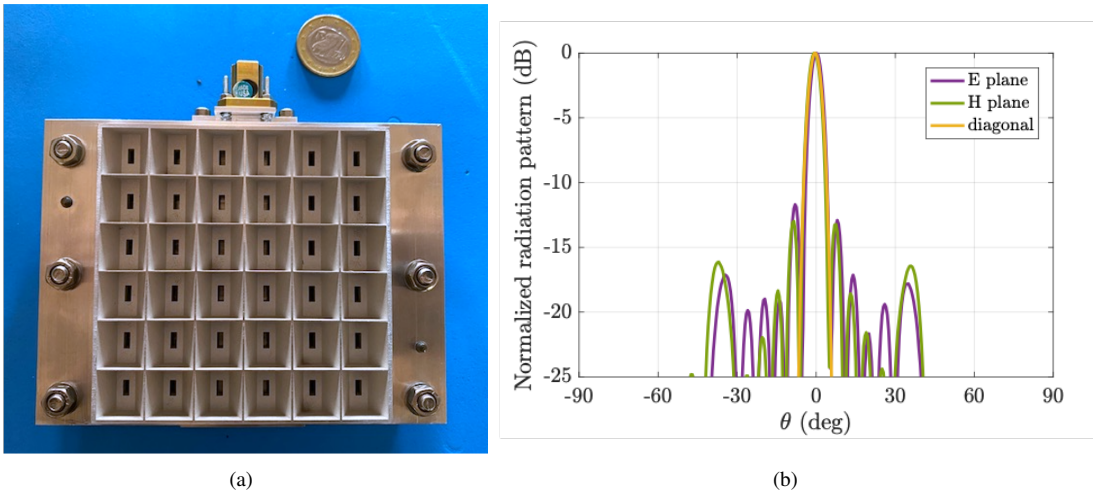
Cost-effective planar array of low profile horns in gap waveguide technology at 38 GHz

Nafsika Memeletzoglou(1) and Eva Rajo-Iglesias(1)
(1) (Department of Communications and Signal Theory, Carlos III University, 28911 Madrid, Spain, nausika@tsc.uc3m.es

The design of a 6x6 array of low profile horns at 38 GHz is presented. The design is made using gap waveguide technology [1]. The low profile horns are dual-mode to obtain a more uniform aperture field distribution to maximize the directivity [2] achieving a 93% aperture efficiency. This is one of the key parts of the proposed design.

The gap waveguide technology is implemented using glide symmetrical holes as in [**?**]. This simplifies enormously the manufacturing but makes difficult the designs of classical corporate feeding networks. For this reason, transverse slots are used to feed the horns and the size of the horns corresponds with the guided wavelength (which is set to $1.7\lambda_0$ by defining the waveguide width). The groove version of gap waveguide technology is the one offering less losses.

The total aperture efficiency of the array is above 89% with more than 30 dBi gain. Manufacturing is made in three pieces that are simply screwed without further requirements related to good electrical contact. The agreement with the experimental results is excellent.



(a) (b)

Figure 1. Measured radiation pattern of the designed antenna and picture of the prototype

References

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