Reflector Antenna with Hat Feed

THE MODEL

The reflector antenna is about 19 wavelengths in diameter. The antenna is excited by a TE_{11} circular waveguide mode. The antenna is depicted below.

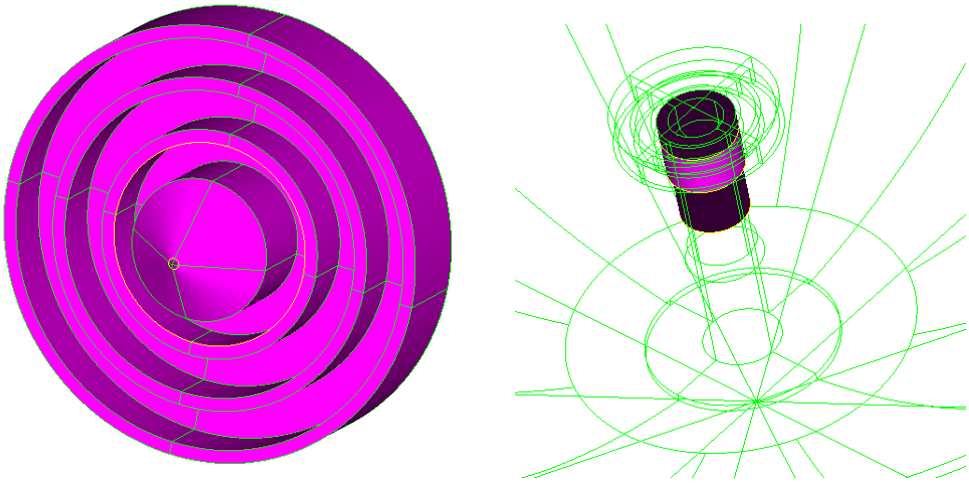

Figure 1. The corrugated sub reflector (left) and the dielectric plug (right).

Figure 2. The reflector antenna with hat feed.

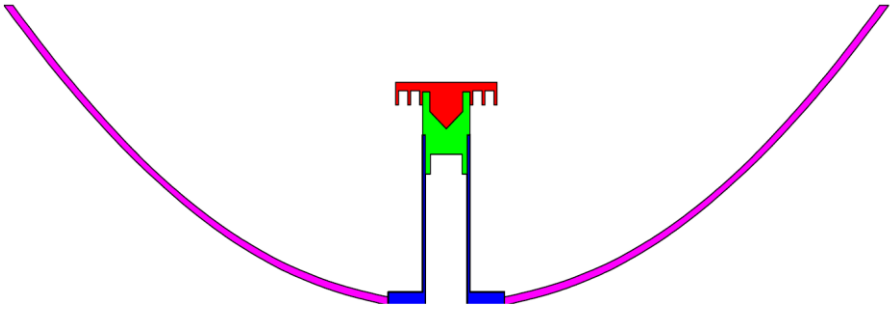

Figure 3. Cross section showing the reflector, the circular waveguide, the dielectric plug and the corrugated sub-reflector.

RESULTS

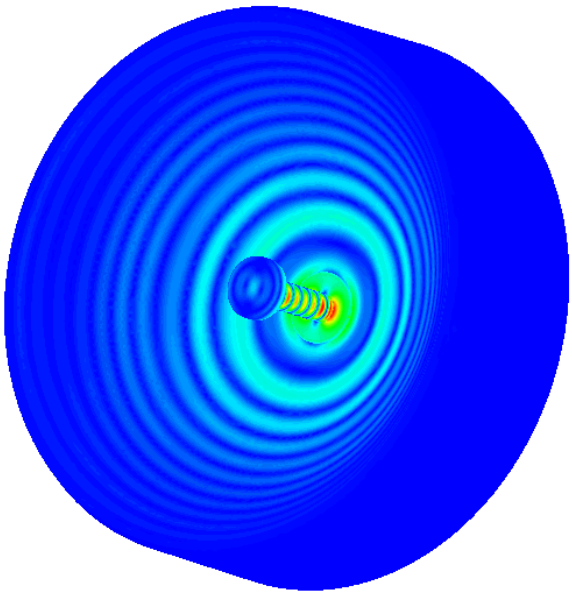

Figure 4. Surface currents.

Data for the reflector antenna with hat feed:

- Reflector diameter 250 mm (18.7 λ)
- MLFMM simulation including PEC and dielectrics
- The dielectric plug (teflon) ε_r = 2.08
- Port excitation
- CFIE =0.6
- SPAI pre-conditioner
- 180x361 far-field angles
- Convergence within 130 iterations

Simulation data	
Frequency	22.4 GHz
Total number of triangles	56700
Total number of MM unknowns	87 000
Time	1.3 h[1]

1/ 4 parallel processes on an Intel Core i5 quad-core 2.4 GHz processor with 8 Gb RAM.

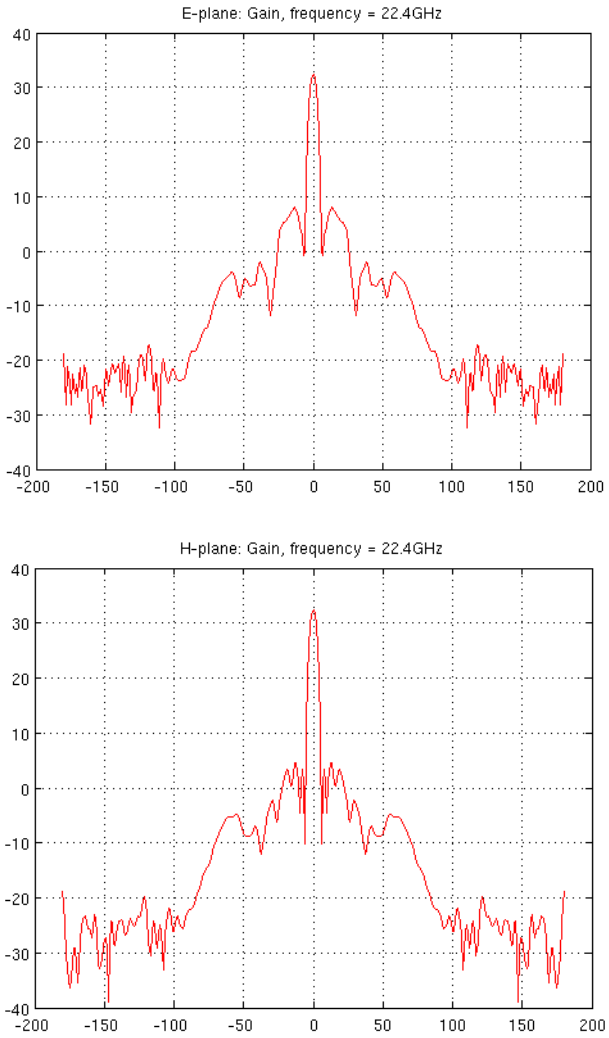

Figure 5. Antenna diagram for E-plane (top) and H-plane (bottom).

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