

EE609: Radiating Systems

Pyramidal Horn Antenna Design

Requirements for the pyramidal horn antenna:

Center frequency: 36GHz

Gain: 30dB

An iterative procedure, as outlined in EE609 lecture on horn antennas, was performed with the aid of a small program written in 'C'. The waveguide chosen was WR28 which has a cutoff frequency of 21GHz and usable frequency range between 26.5GHz to 40GHz. The initial guess for σ was

$$\sigma_{init} = \frac{G}{2\pi\sqrt{6}} = 64.974$$

The code converged in 12 iterations to $\sigma_{final} = 64.204$. The convergence criteria was that the error should be within 1% of σ . The final horn dimensions are shown below

Sl. No.	Design Parameter	Value
Waveguide Dimensions (WR28)		
1	a	7.112 mm
2	b	3.556 mm
Horn Dimensions		
1	l_E	535.040 mm
2	l_H	547.949 mm
3	A	117.041 mm
4	B	94.431 mm