

Design Specs:

Dish size: 0.6m

Focal point: 0.3m

F/D= 0.5

Required frequency range: 8-14GHz (can range from 2-20GHz as well)

Linear Polarization

Design based on paper1:

$\delta = 106$ degrees [fig.2, paper-1 attached]

$\beta = 10$ degrees

$\alpha = 67.5$ degrees

$\Psi = 45$ degrees

Taw=0.707 [fig.4, paper-1 attached]

10dB Beamwidth :

E plane: 106degrees

Hplane: 135degrees [fig.5, paper-1 attached]

Chx impedance: 160ohm approx @ $\Psi = 45$ degrees [fig.6, **paper-1** attached]

Issues:

- How to find max length (R_1) = ?
- Width of the first tooth gap ($R_1 - r_1$)
- Max number of tooth we'll require (R_N)
- Supporting issues for the feed
- Feeding procedure

Assumptions based on papers:

$R_1 = 10\text{inch} = 0.3386 * \lambda$ (defined from the frequency in the paper) [based on **paper 2** attached]

For 2GHz: $R_1 = 0.3386 * \lambda = 50.79\text{mm}$

And $r_1 = 42.7\text{mm}$

$R_1 - r_1 = 8.09\text{mm}$

But the issue for the number of tooth gaps towards the high frequency end is still confusing for which I need assistance. And I am not even sure if my assumptions are correct.

Also I plan to print it on PCB (Rogger's High frequency material series)

Also could you please clarify the pros and cons for using LPDA as feed?

Or what I mean is the comparison of Horn as a feed or LPDA as a feed for the followings:

- Gain
- Size
- Blockage area
- Impedance
- Bandwidth Efficiency
- Antenna Efficiency
- Taper loss

Looking for the kind assistance please.

Any suggestion, improvement, amendment, correction in the design will be highly appreciated with thanks.