

A large, bright, cratered moon is shown in a clear blue sky. The moon is the central focus, appearing as a large, glowing sphere with numerous dark spots (craters) and lighter patches (maria). The sky is a uniform, clear blue. The text "Big Boys 70 cm Super Feed" is overlaid on the moon in a large, black, sans-serif font.

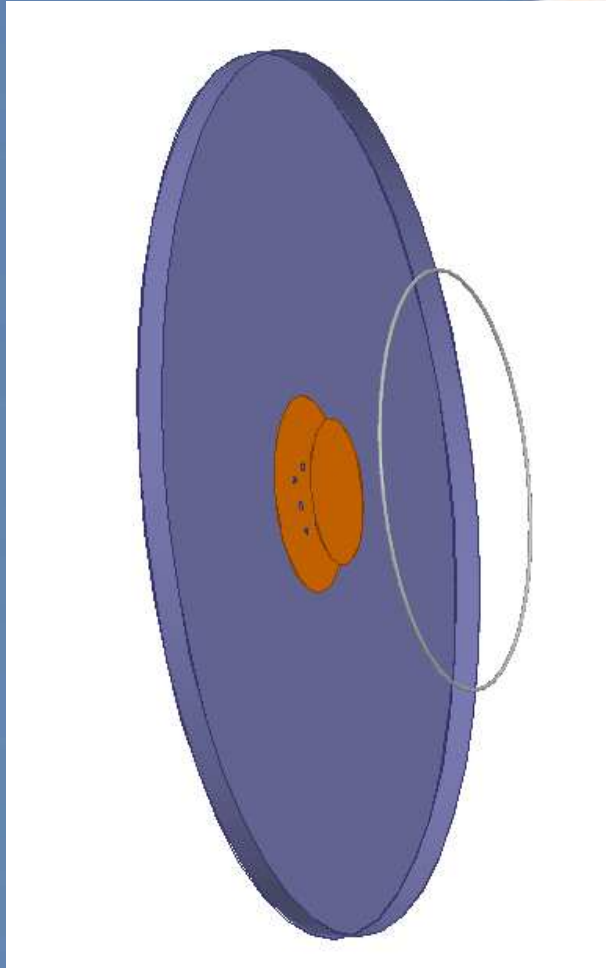
Big Boys 70 cm Super Feed

Not for everyone

What do you think about this!?

- Over **80% peak efficiency** on 70 cm according to Feed_GT
- **>3 dB better G/T** than the Dual Dipole Feed according to Feed_GT
- Easy to set up with two polarizations
- Easy to set up for circular polarization
- Easy to build and not sensitive to tolerances
- So, what is the catch? Is the speaker crazy?

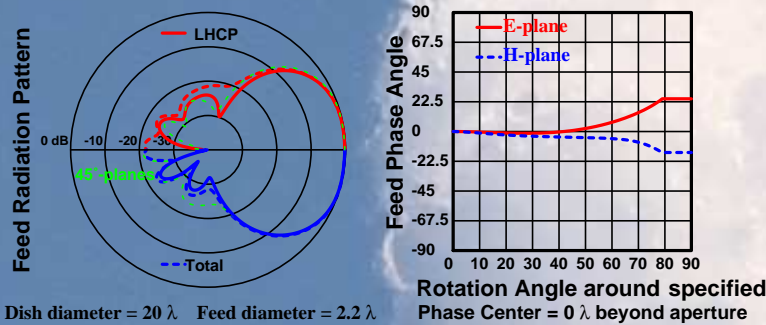
Size



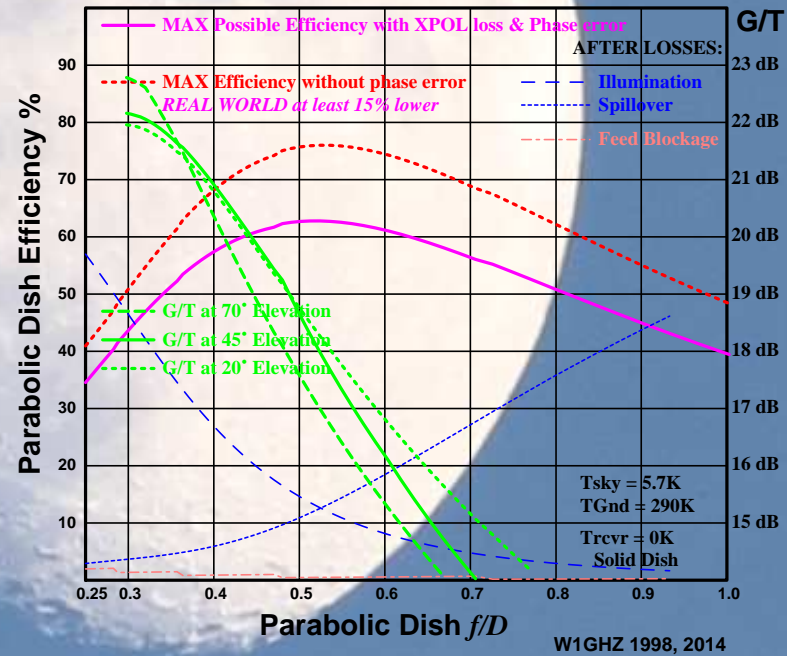
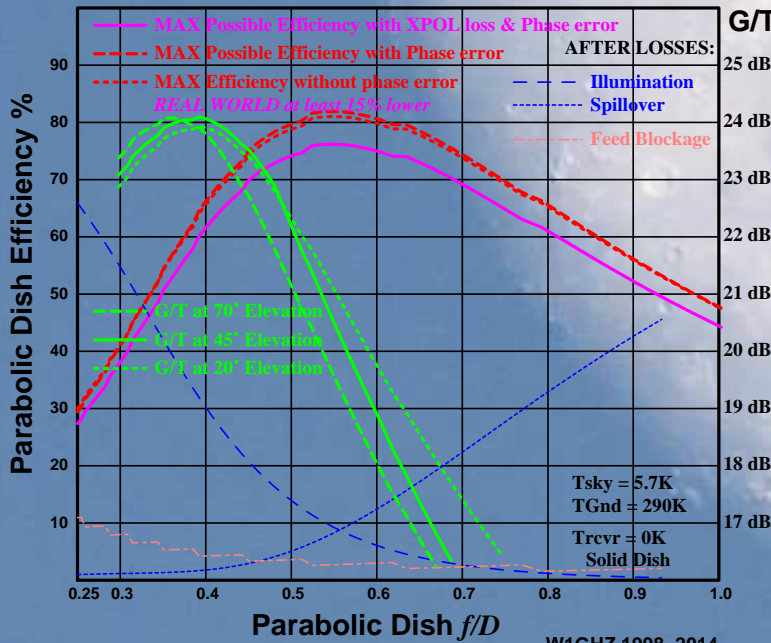
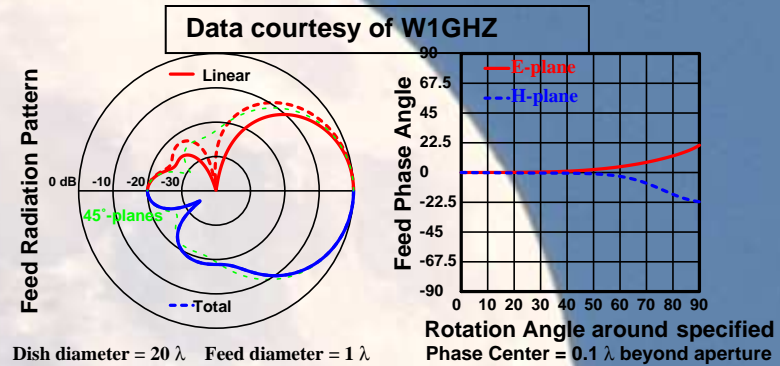
The reflector is almost as tall as a man

Feed performance

SM6FHZ Super Feed

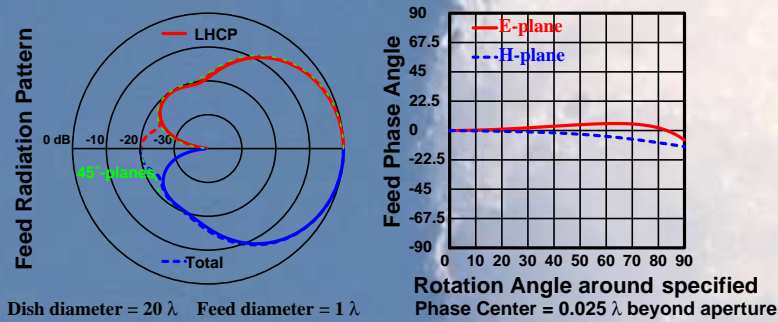


EIA dual-dipole feed with 1 λ diameter round GP at 1296

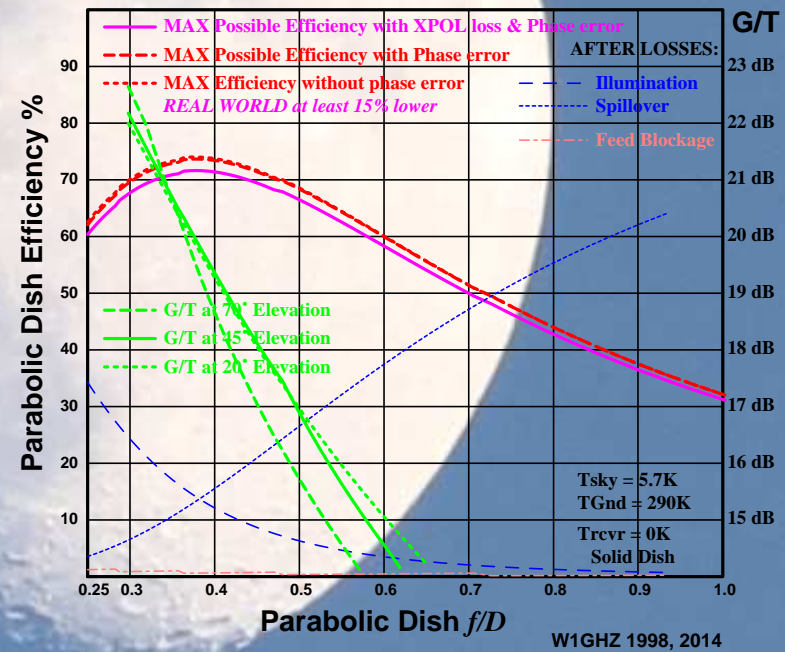
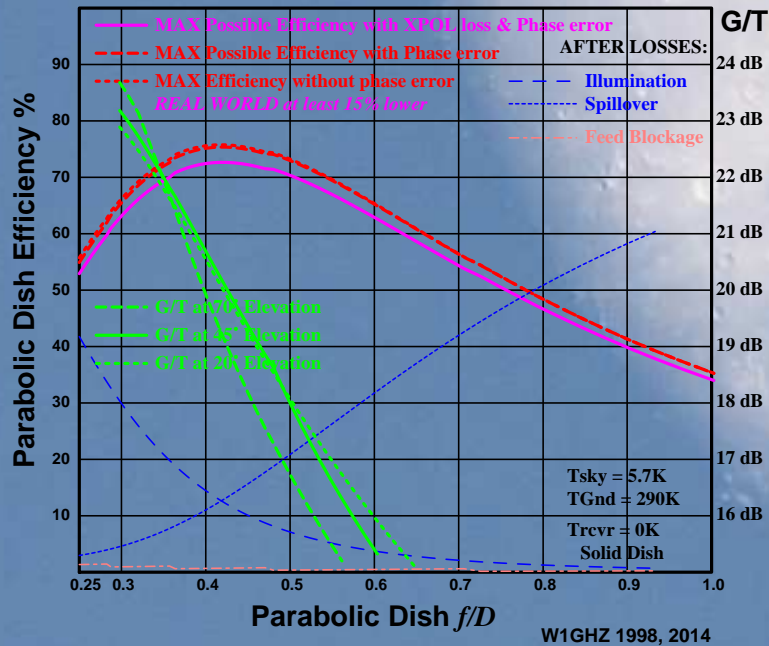
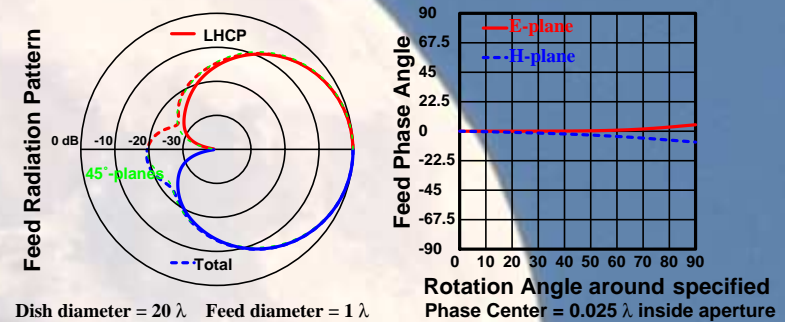


Feed Performance Comparison

SM6FHZ 23cm Patch Feed with BFR



SM6FHZ 23cm Patch Feed



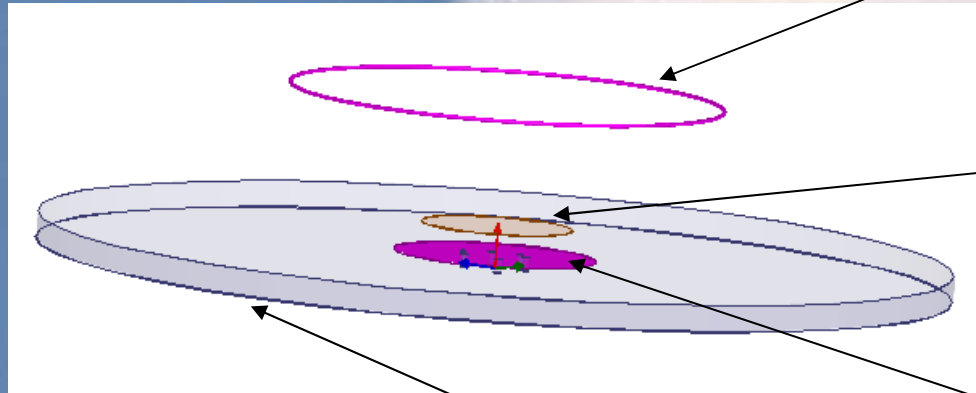
Feed Performance Comparison

| Feed type | G/T performance in a 20 wl dish at $f/D=0.45$ |
|--|---|
| SM6FHZ Super Feed | 23.5 dB |
| Standard Dual Dipole Feed | 20 dB |
| SM6FHZ small Patch Feed with BFR *NOTE* This feed is aimed at a slightly lower f/D | 19 dB |
| SM6FHZ small Patch Feed Similar to e.g. the OK1DFC Loop Feed *NOTE* Both these feeds are aimed at lower f/D 's | 18 dB |

Prerequisite

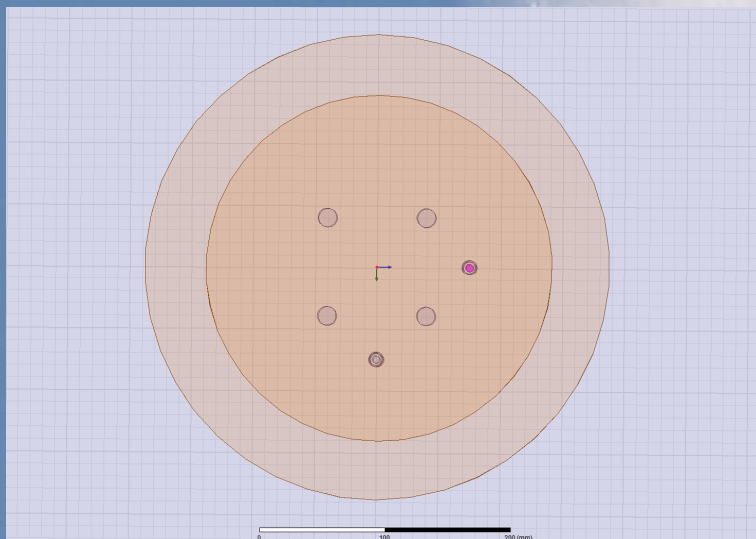
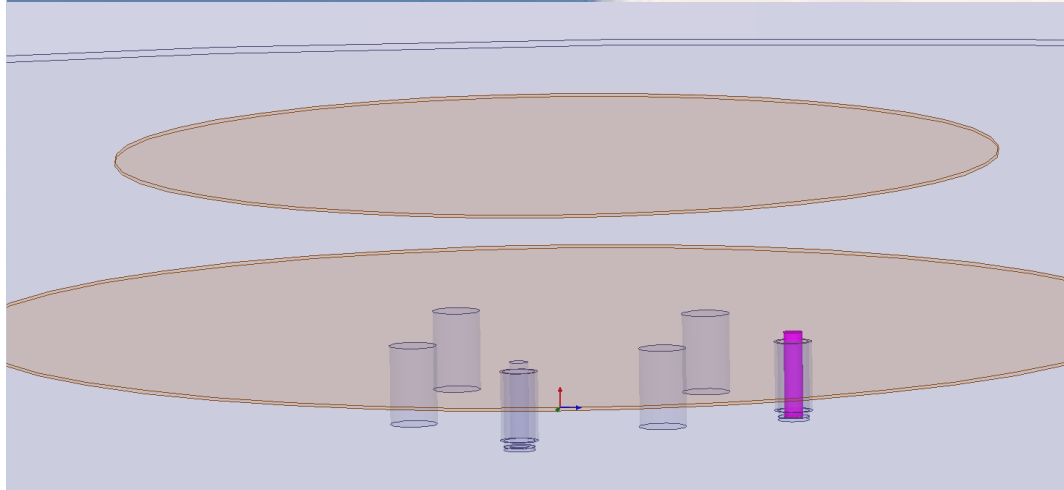
- I did some previous 70 cm feed work with the Beam Forming Ring (BFR) from the below papers by Kildal et. al. This was presented in http://2ingandlin.se/FHZ_loop_BFR_feed.html (March 2011)
- I got a lot of ideas for this feed from these papers:
 - Dipole-Disk Antenna with Beam-Forming Ring, Per-Simon Kildal, Svein A. Skyttemyr, IEEE Transactions on Antennas and Propagation, Vol. AP-30, No. 4, July 1982, page 529 - 534.
 - A Small Dipole-Fed Resonant Reflector Antenna with High Efficiency, Low Cross Polarization, and Low Side lobes, Per-Simon Kildal, IEEE Transactions on Antennas and Propagation, Vol. AP-33, No. 12, December 1985, page 1386 - 1391.
- I have also worked with patch feeds before e.g. the 23 cm patch feed presented at the Swedish EME Meeting in 2013
- So, this feed is a combination of the above plus a few new ideas

Feed dimensions



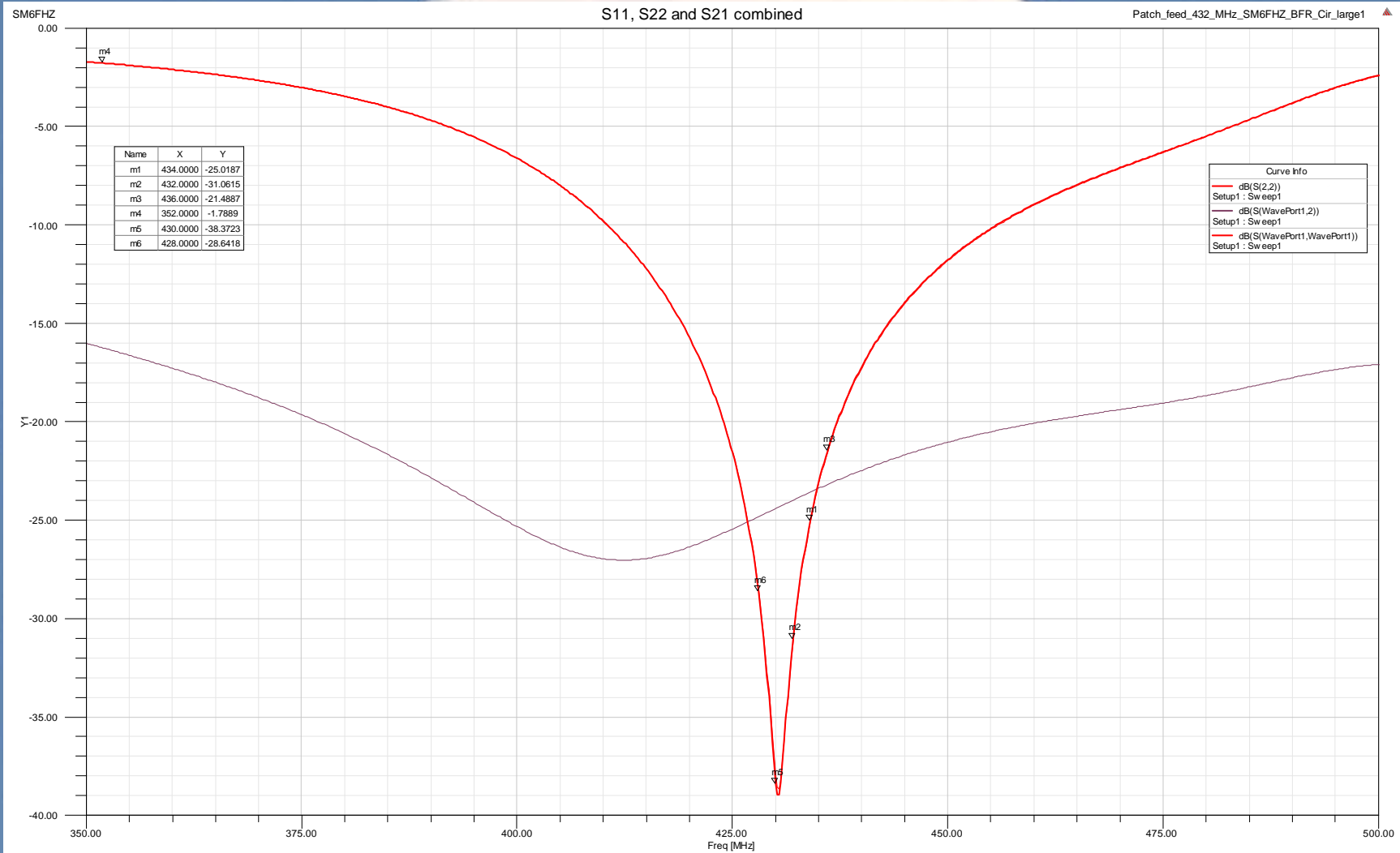
- BFR
 - Diameter: 806 mm
 - Position: 320 mm
 - Material: 8 mm Al tube
- Patch 2
 - Diameter: 280 mm
 - Position: 80 mm up
 - Material: 1 mm Cu or Al
- Patch 1
 - Diameter: 376 mm
 - Position: 25 mm up
 - Material: 1 mm Cu
- Reflector
 - Diameter: 1700 mm
 - Baffle height: 50 mm
 - Material: 1 mm Aluminum

Probe details

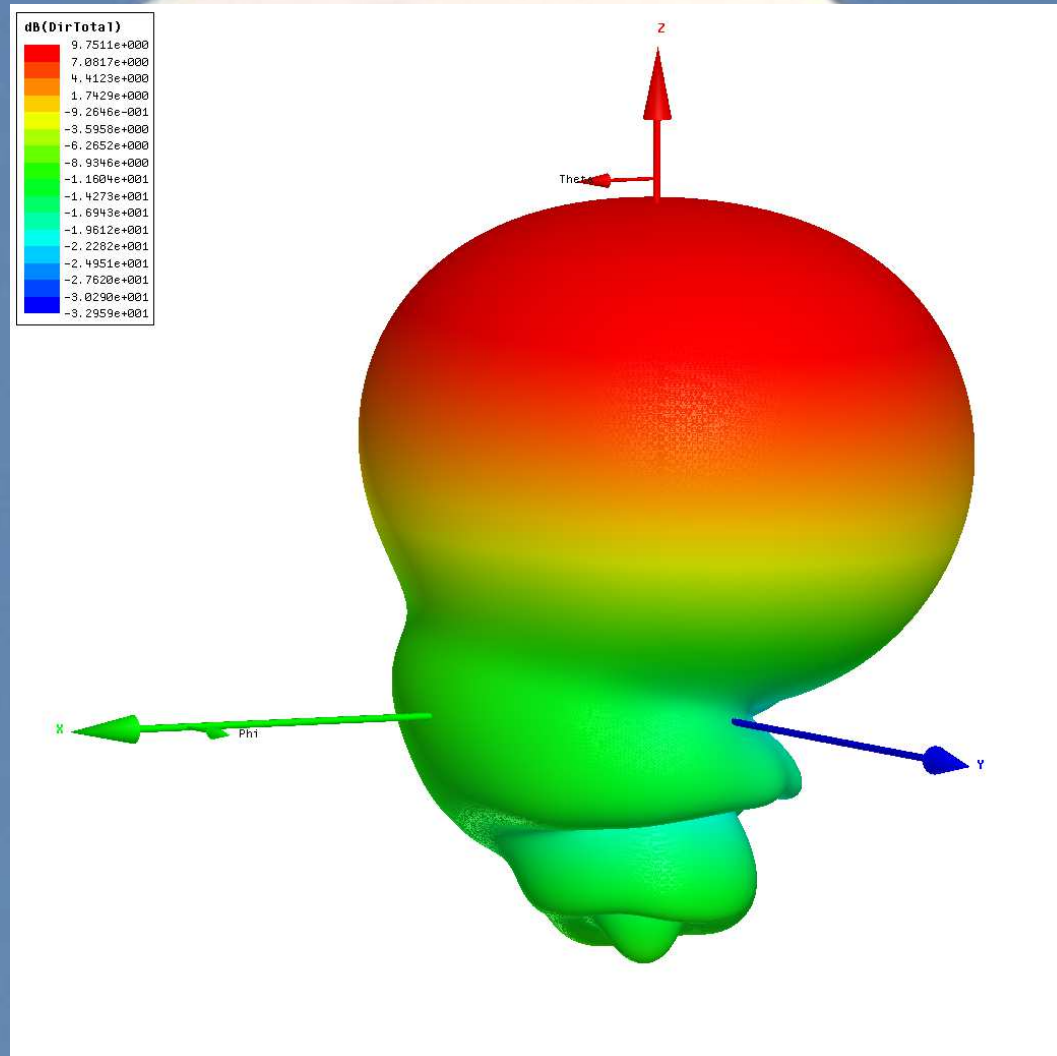


- Probe position
 - 75 mm from center of patch
 - Two probes at orthogonal positions
- Probe dimension
 - Coax, 6 mm inner and 12/10 mm outer conductor
 - 5 mm spacing of outer conductor close to the patch
- Supports
 - As you like, Teflon is good

S-parameters



Far Field 3D pattern



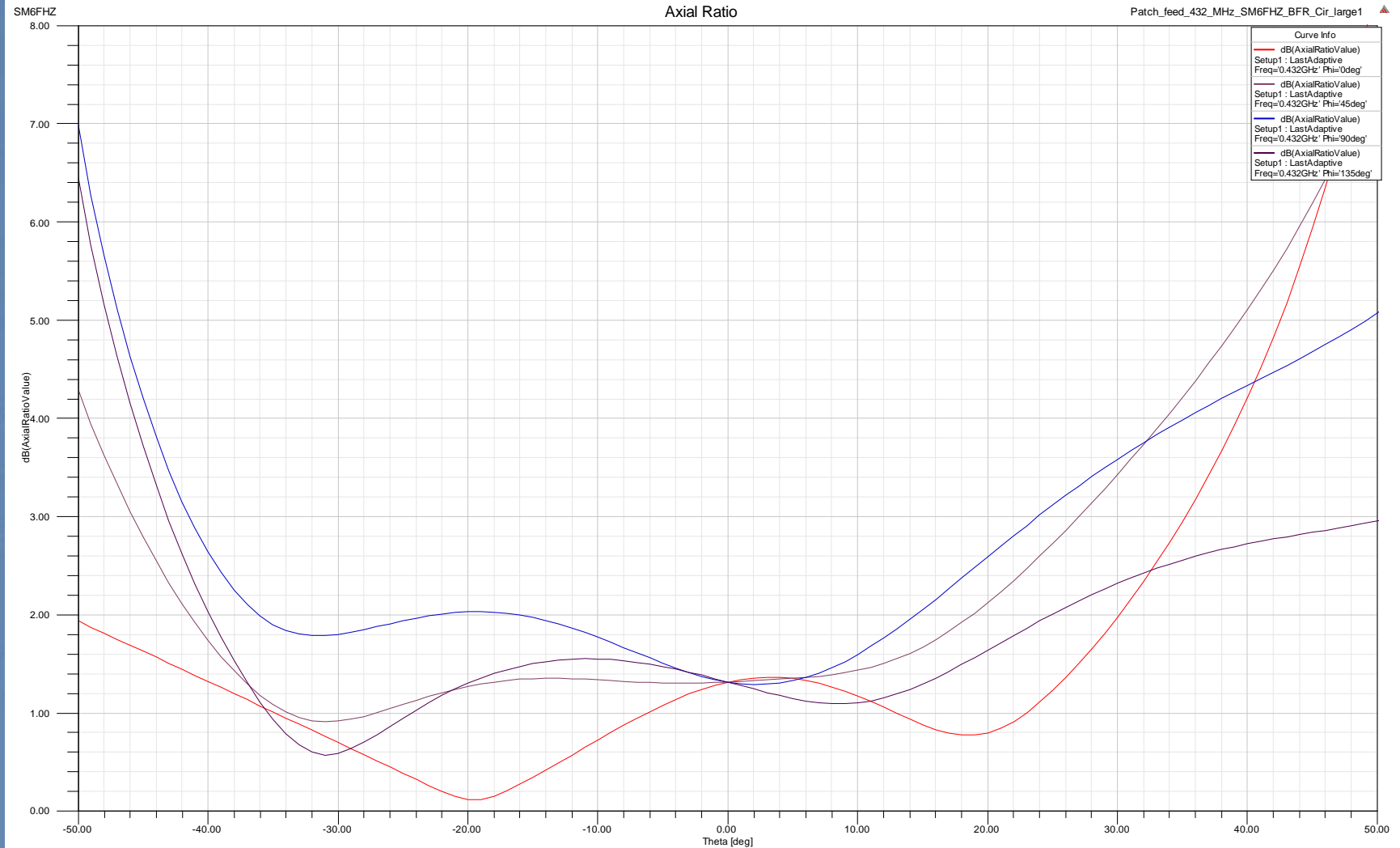
Far Field Co and Cross patterns



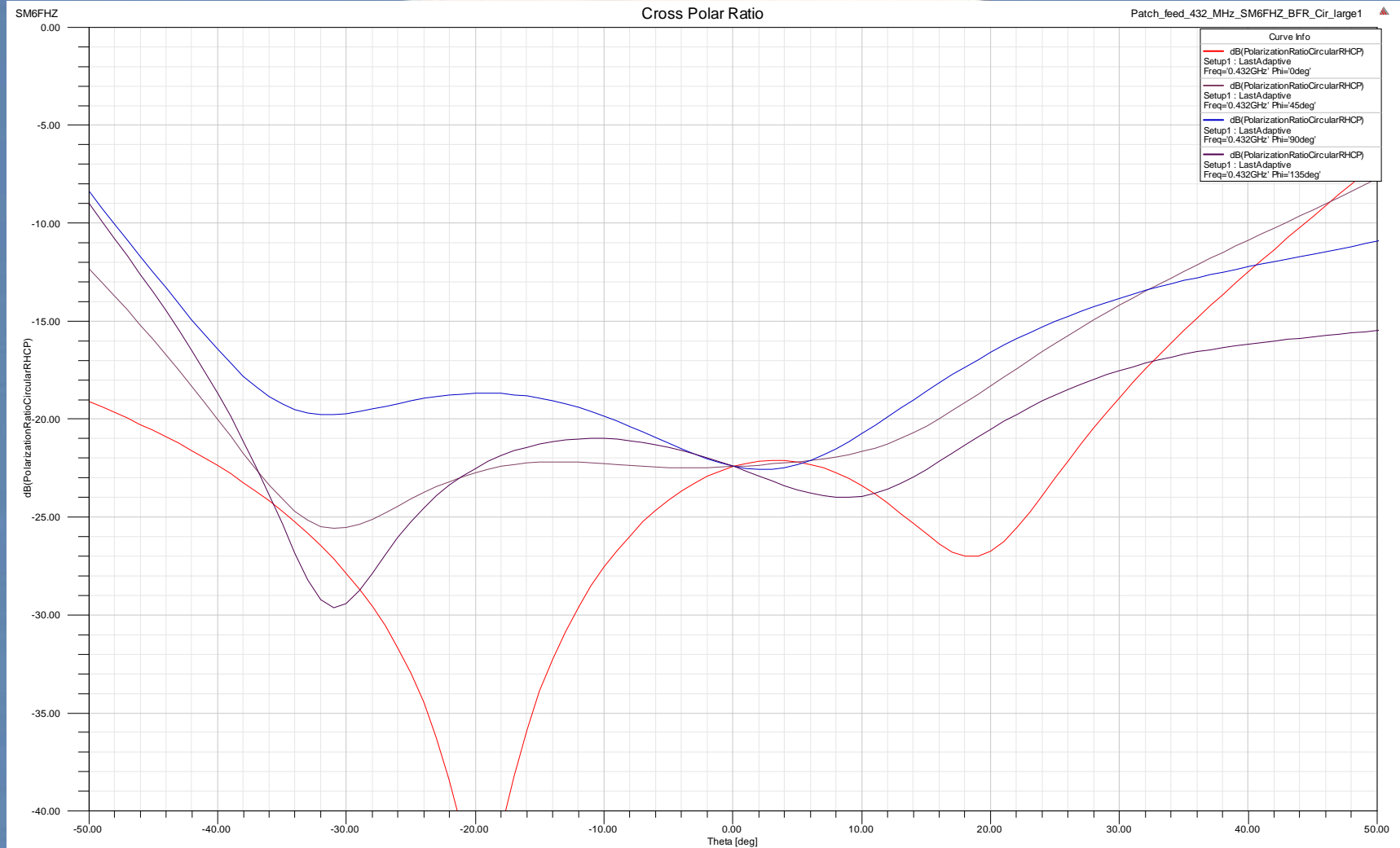
Far Field Total Power patterns



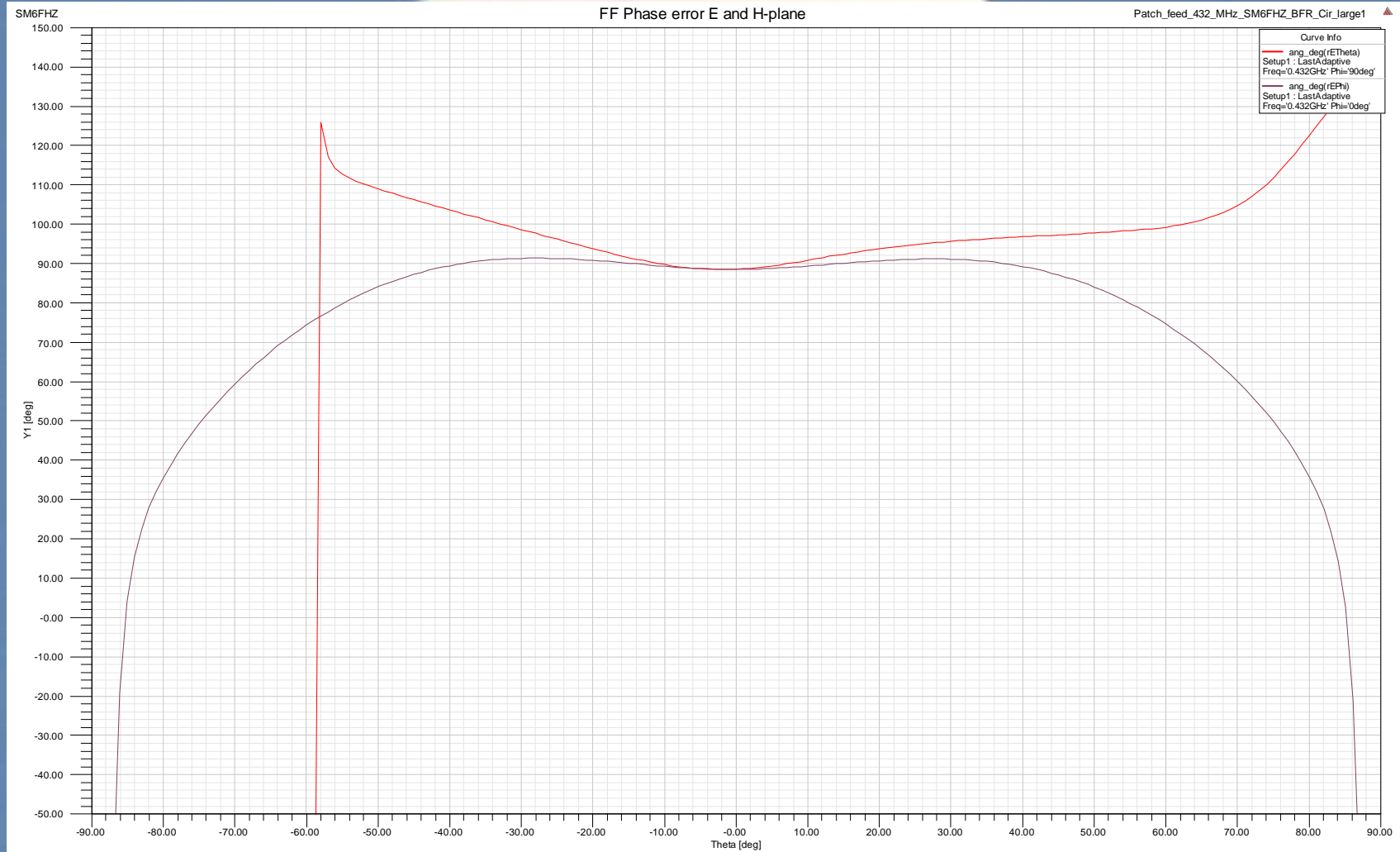
Far Field Axial Ratio



Far Field Cross Polar Ratio



Far Field Phase error



Acknowledgments



- Paul, W1GHZ
- Lars, SM4VE
- Zdenek, OK1DFC

Conclusions

- There is a difference in performance between different feeds!
- It is possible to shape the pattern on a 70 cm feed in the same way as for the 23 cm Kumar choke feeds in order to improve efficiency
- The price you pay for shaping the beam is feed size. You need some volume to be able to do the magic
- Again; You can gain dB's in choosing the proper feed for your situation. In EME every tenth of a dB is valuable



Thank you very much!

**Hope to see you on
70 cm CW EME!**

Revision history



- Rev A; As presented at The Swedish EME Meeting, May 2015