



# Reverse engineering on Procom 10 GHz dish

The last but not the least  
Release 1a

# Target

After getting a 60 cm dish copy of this antenna from a hamfriend with exactly same feed horn principle, I discover that its scalar measures were absolutely wrong, giving roughly an  $S_{11} < 6$  dB

So I'd decide to make an entire reverse engineering study of my own, a real 48 cm manufacturer PROCOM design

## Abstract

1/ Procom study

- Manufacturer claimed specs
- Various scalar  $S_{11}$  measurements
- WR90 dimensions & position
- Pillbox feed horn position & final outside protection

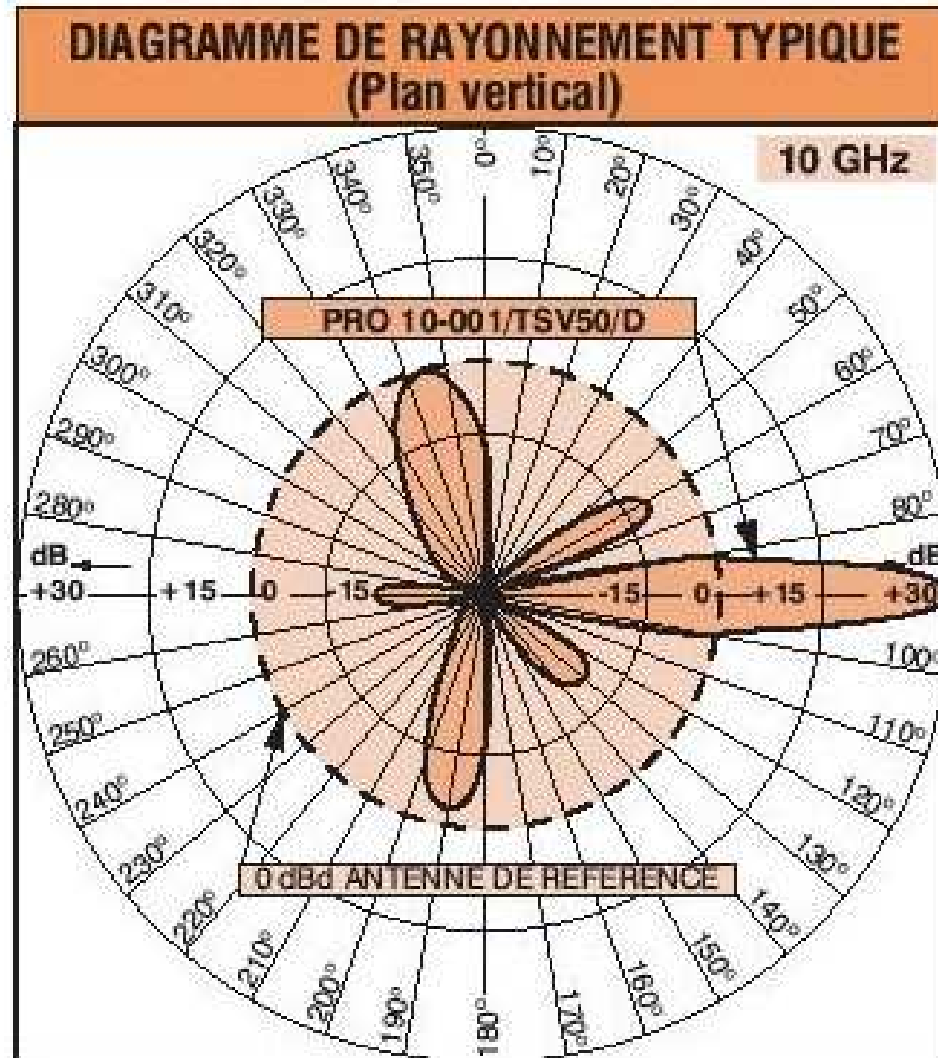
2/  $S_{11}$  of 2 horns coming from F6AJW

# 1- Procom study

# Manufacturer specs

Original Procom prime focus dish PRO 10-001/TSV50/D

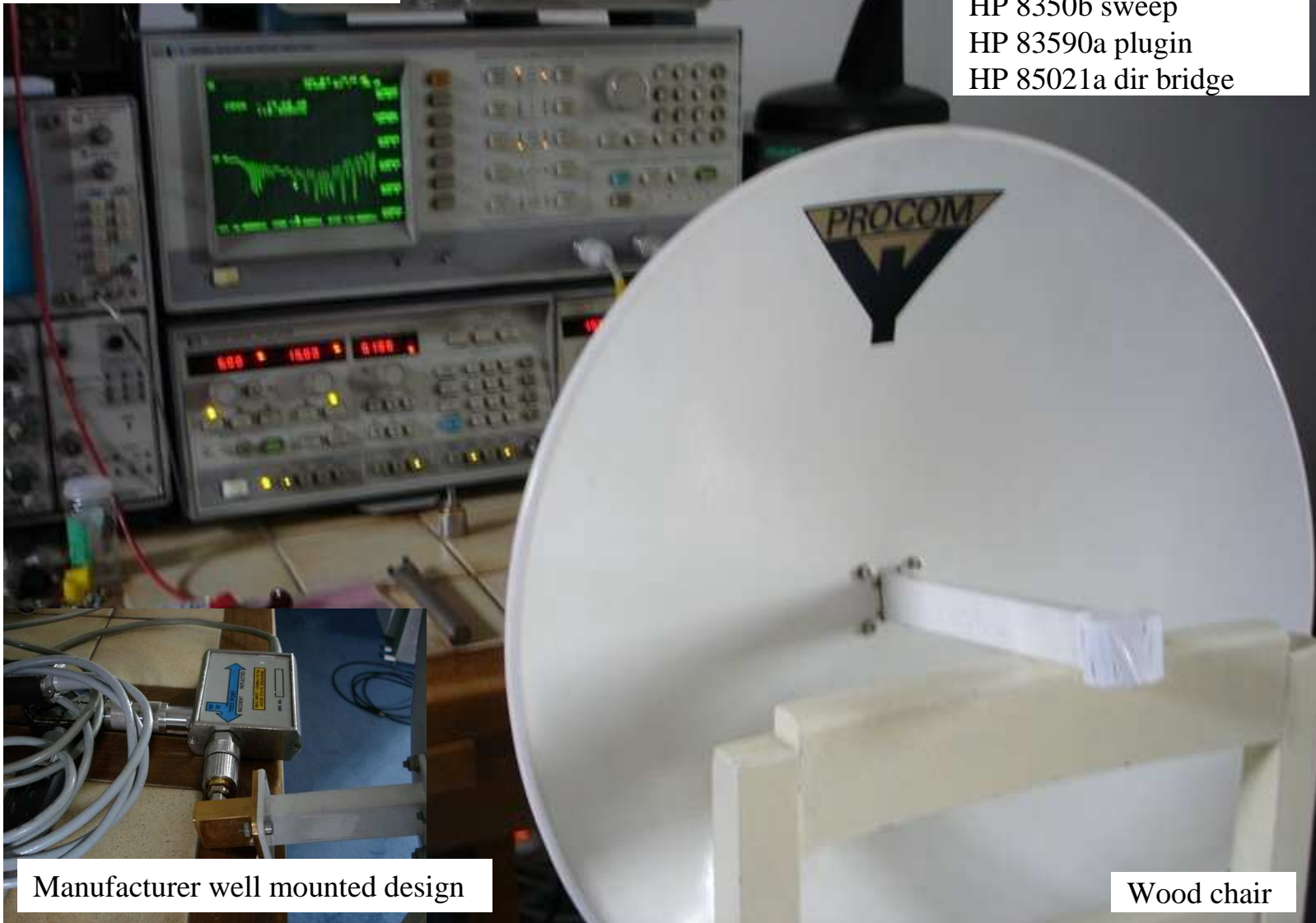
Diameter 48 cm  
Gain à 10 GHz = 27 dBd  
F/D = 0.4



# Scalar S11 measurements

Scalar measurement setup

HP 8756a scalar analyser  
HP 8350b sweep  
HP 83590a plugin  
HP 85021a dir bridge

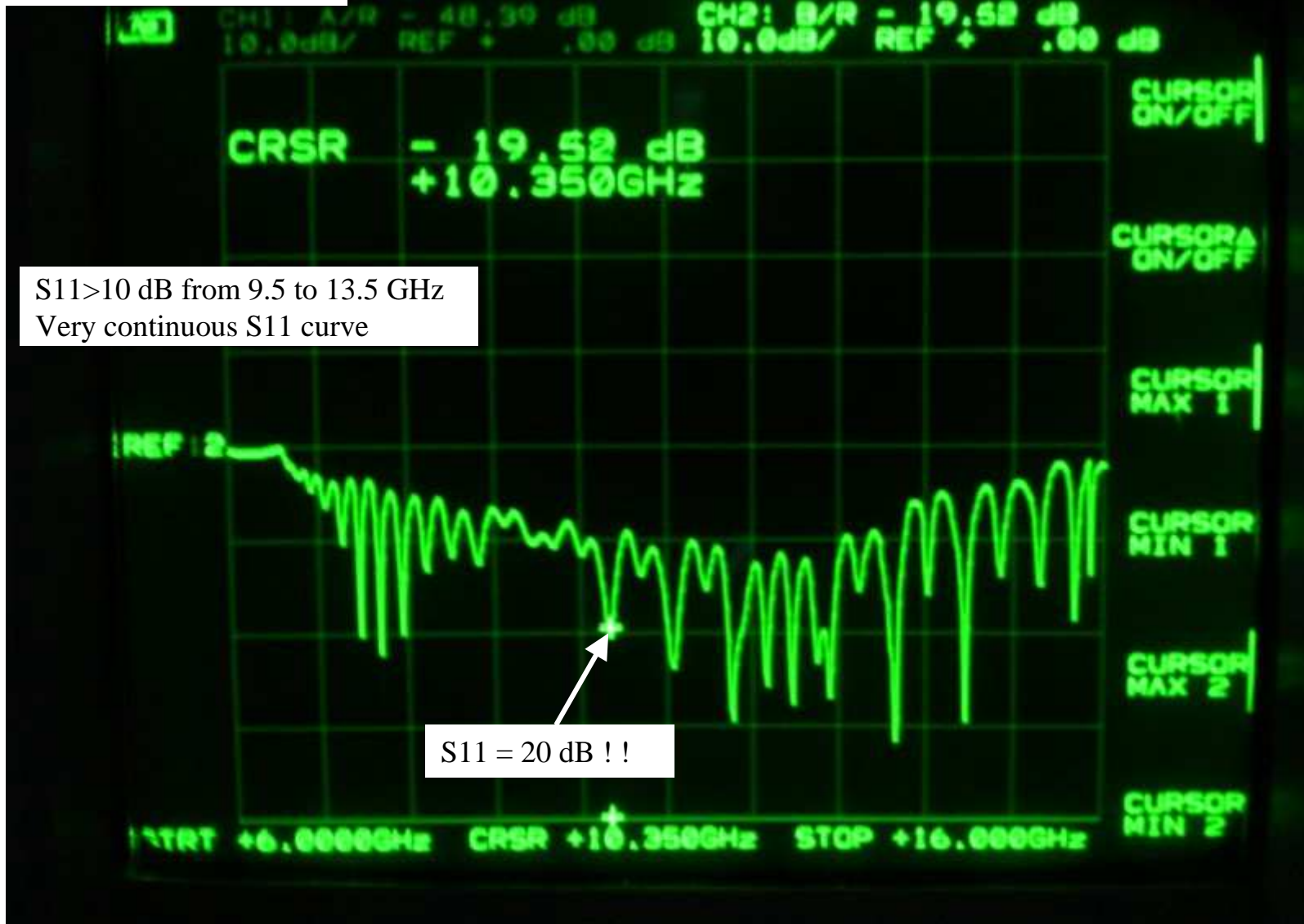


Manufacturer well mounted design

Wood chair

# Scalar S11 measurements

Direct scalar S11 meas





# Scalar S11 measurements

Scalar meas : influence of dish position



Dish loosened now at  $\frac{1}{2}$  distance

Wood chair

# Scalar S11 measurements

Scalar meas : influence of dish position





# Scalar S11 measurements

Scalar meas : dish –totally removed



Pillbox alone

# Scalar S11 measurements

Scalar meas : dish –totally removed



Dish or not, the S11 curve must be roughly the same !!  
Whole curve only a little worse

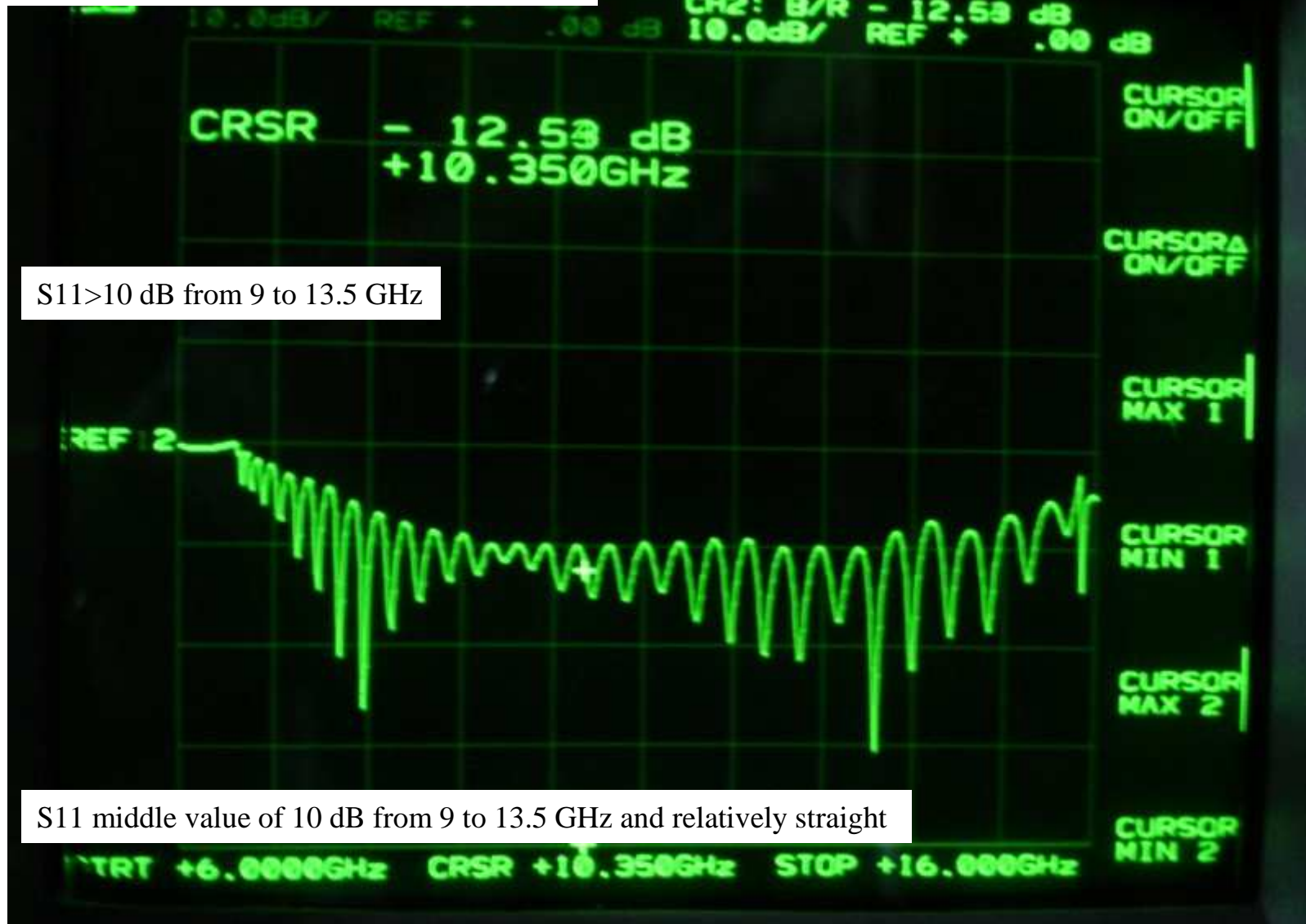
# Scalar S11 measurements

Scalar meas : feed horn totally removed



# Scalar S11 measurements

Scalar meas : feed horn totally removed

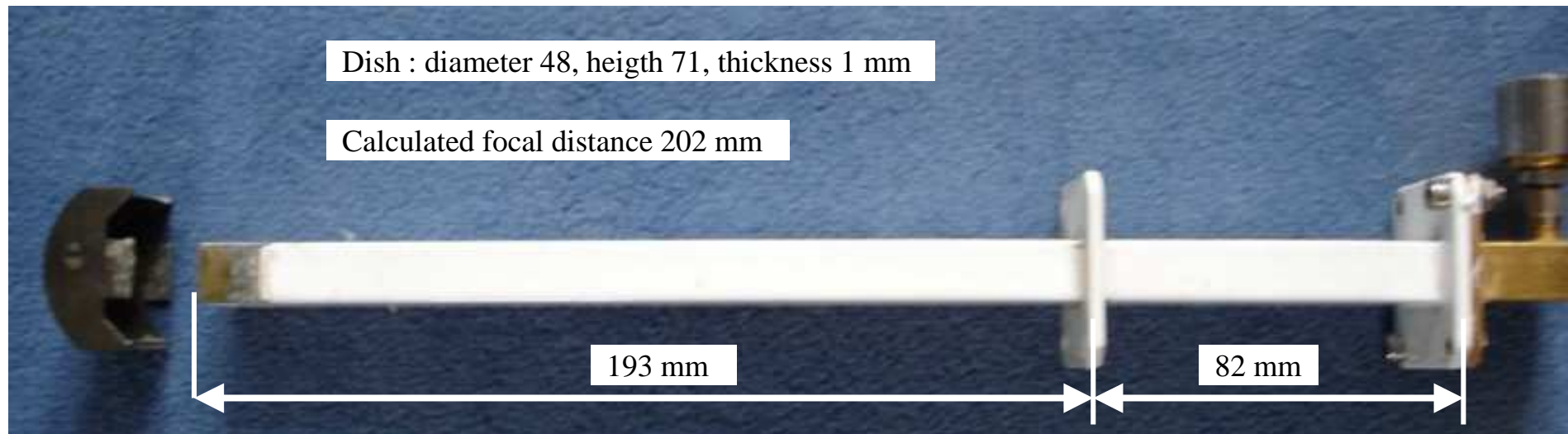


S11 > 10 dB from 9 to 13.5 GHz

S11 middle value of 10 dB from 9 to 13.5 GHz and relatively straight

# Waveguide + feed horn dimensions

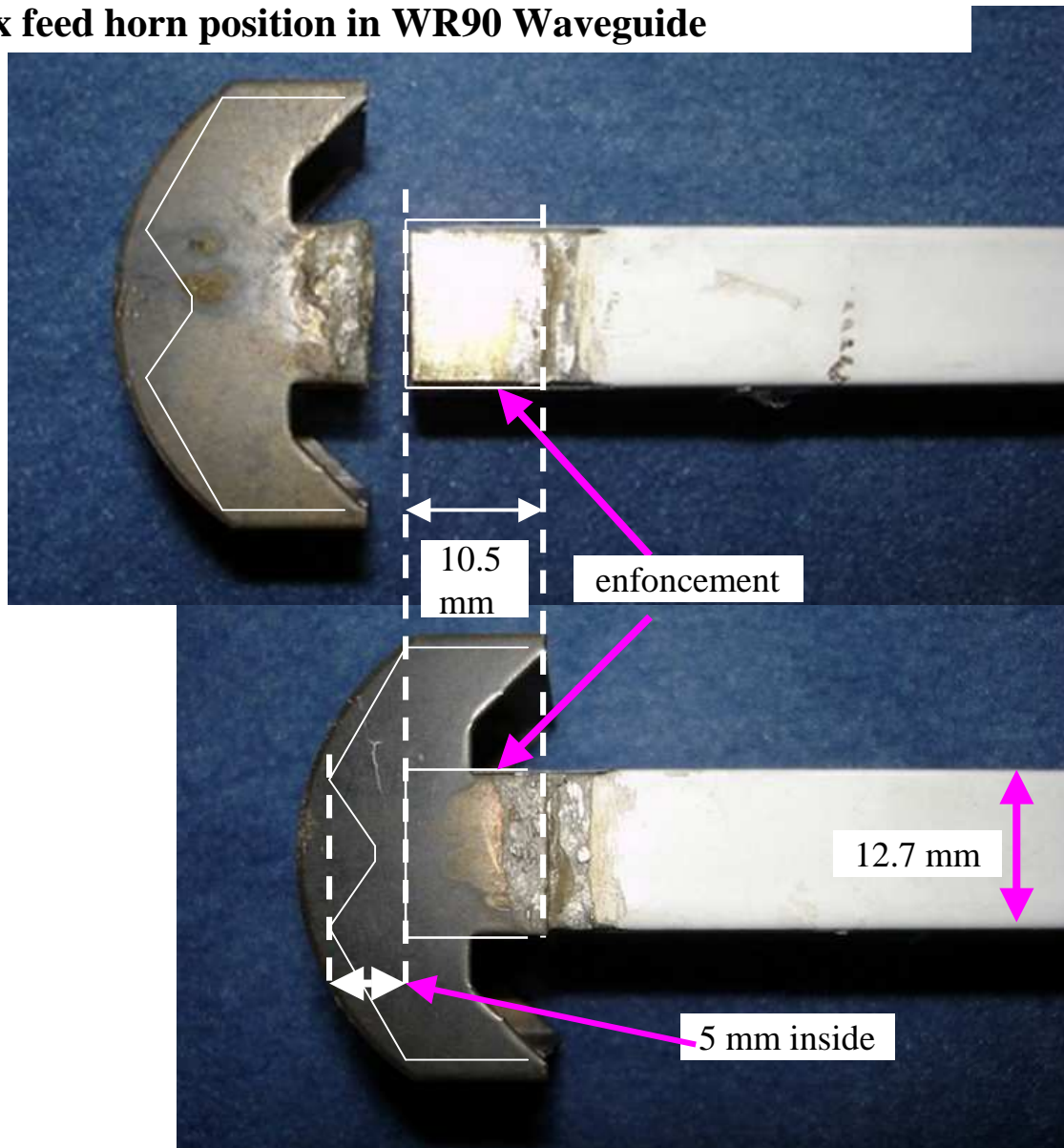
## WR90 waveguide + Feed horn original dimensions





# Waveguide + feed horn dimensions

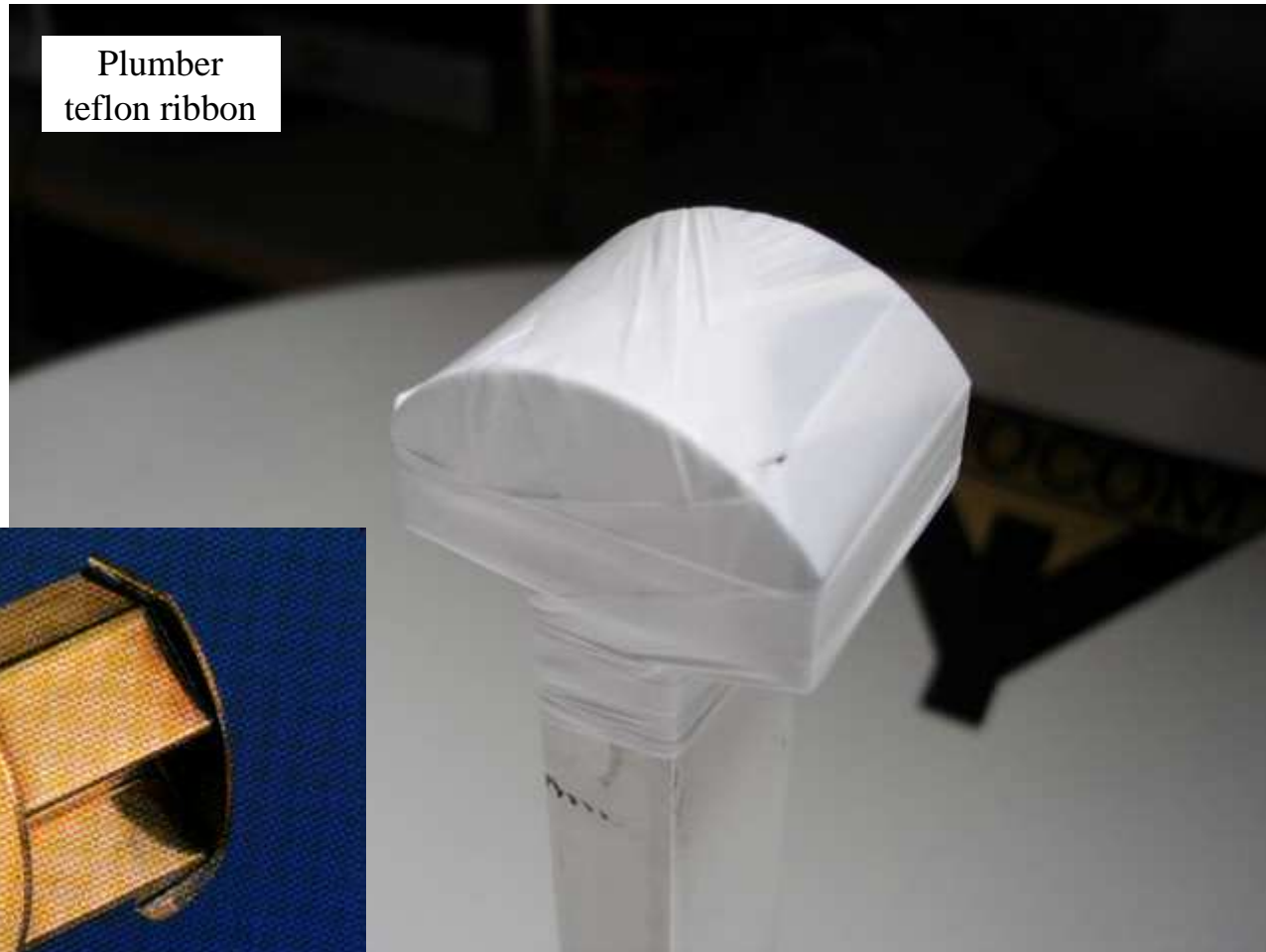
Pillbox feed horn position in WR90 Waveguide



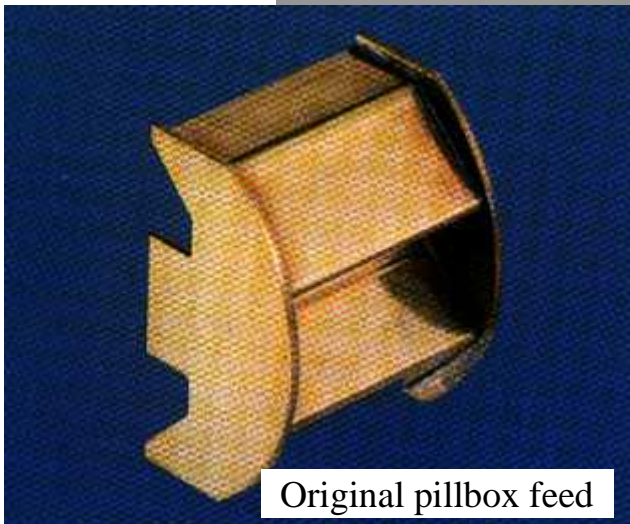


# Waveguide + feed horn dimensions

**Pillbox feed horn position protection against insect invaders !**



Plumber  
teflon ribbon



Original pillbox feed

# Waveguide + feed horn matching

WR90 natural matching with lovely grasshoppers : any idea of the resulting S11 ??



## **2- S11 of 2 well known horns (F6AJW)**



# RTC horn



# Other greater horn

