# De Meetkamer

Ringkernen meten, of de kunst van het weglaten

# De Meetkamer

- Ferriet , ringkernen lastig te meten
- Resultaten vaak niet reproduceerbaar

# De Meetkamer

Waarom het niet werkt

- Meerdere windingen, los draad, nooit hetzelfde
- Parasitaire capaciteit geeft ongewenste resonanties

# De Meetkamer

Ideeën

- IN3OTD
- Whitham D. Reeve, Tom Hagen en Kurt Poulsen
- MEASUREMENT TECHNIQUES AND APPLICATION OF COMBINED PARALLEL/ORTHOGONAL MAGNECTIC BIAS ON A FERRITE TUNED RESONATOR IN LOW FREQUENCY RANGE (3-10 MHz)

# De Meetkamer

IN3OTD

- Coax met ferriet als diëlectricum

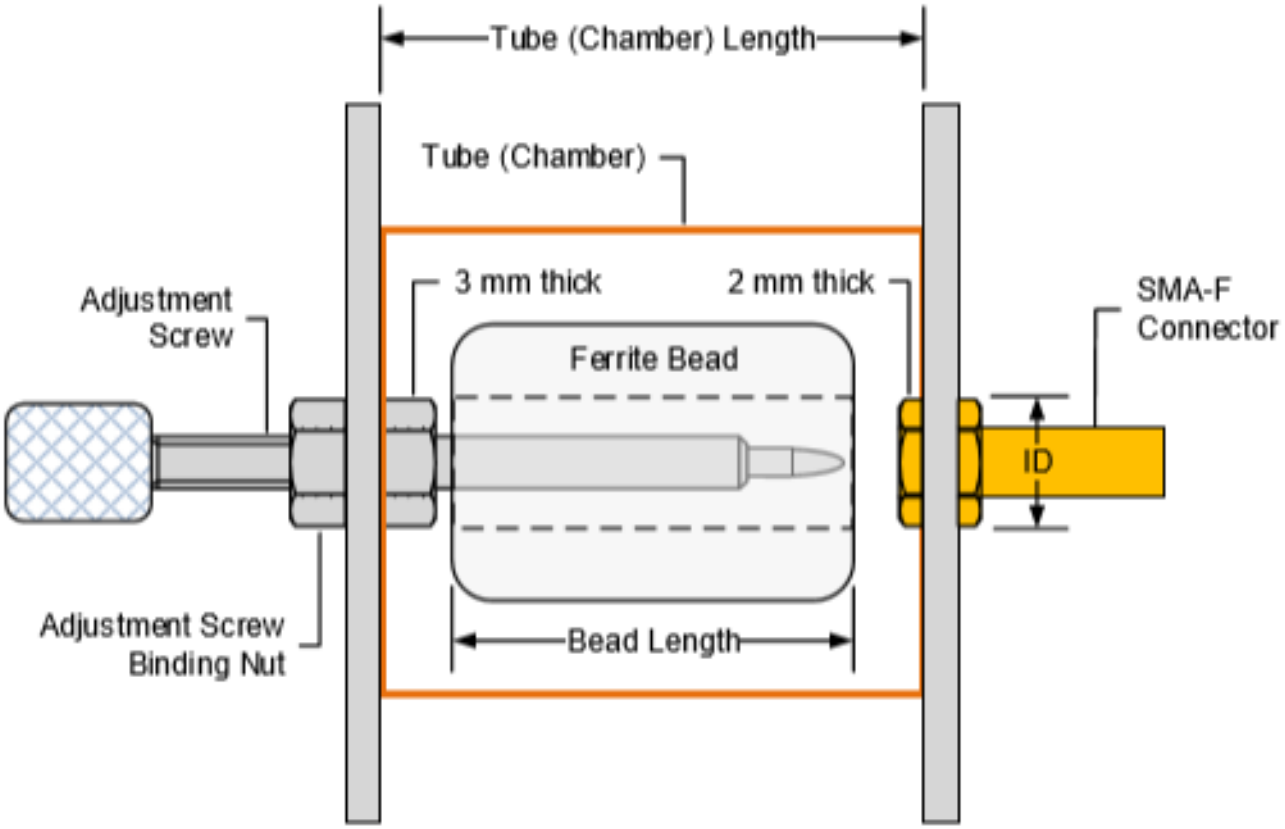
# De Meetkamer

IN3OTD

- Draadje

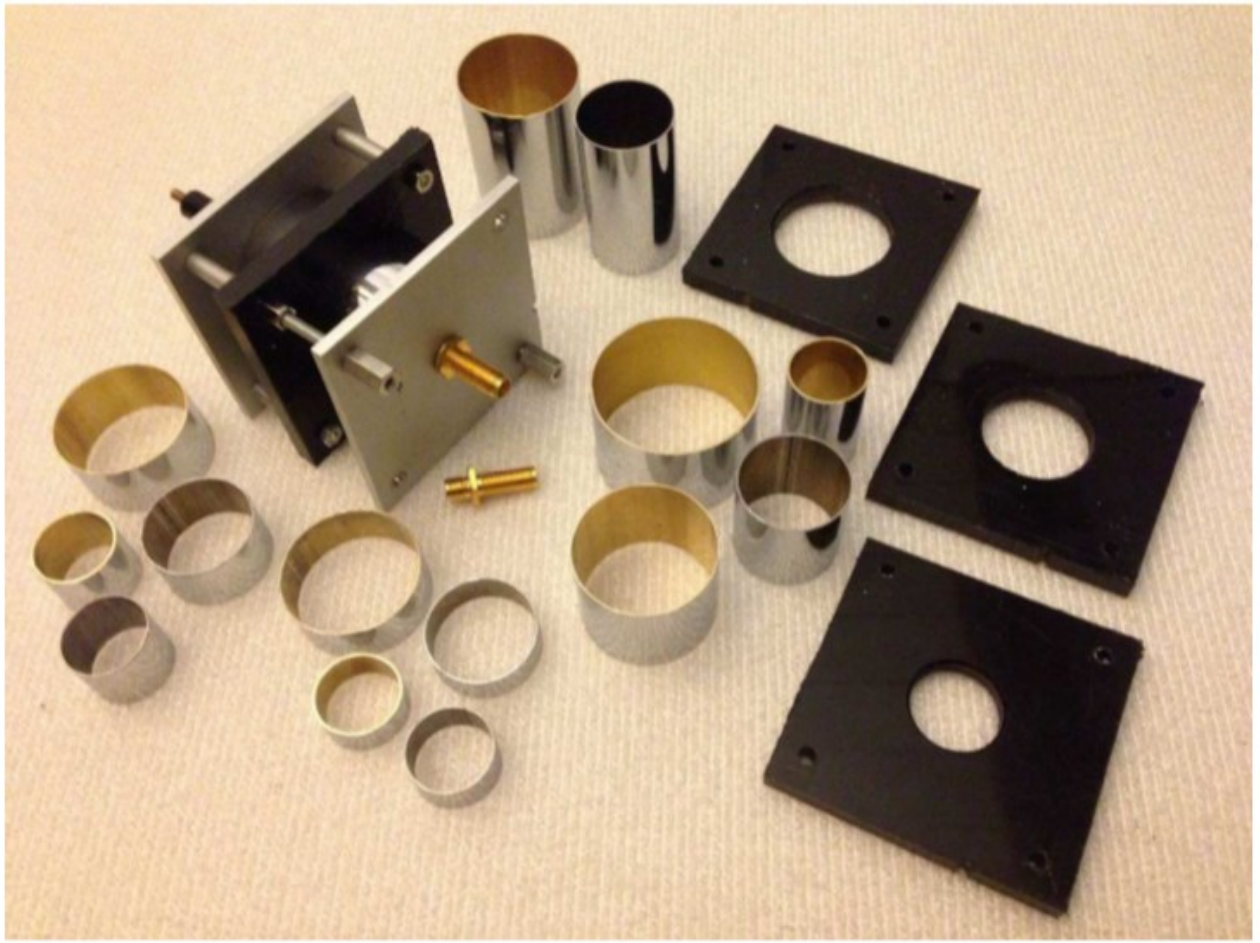
# De Meetkamer

Whitham D. Reeve, Tom Hagen en Kurt Poulsen

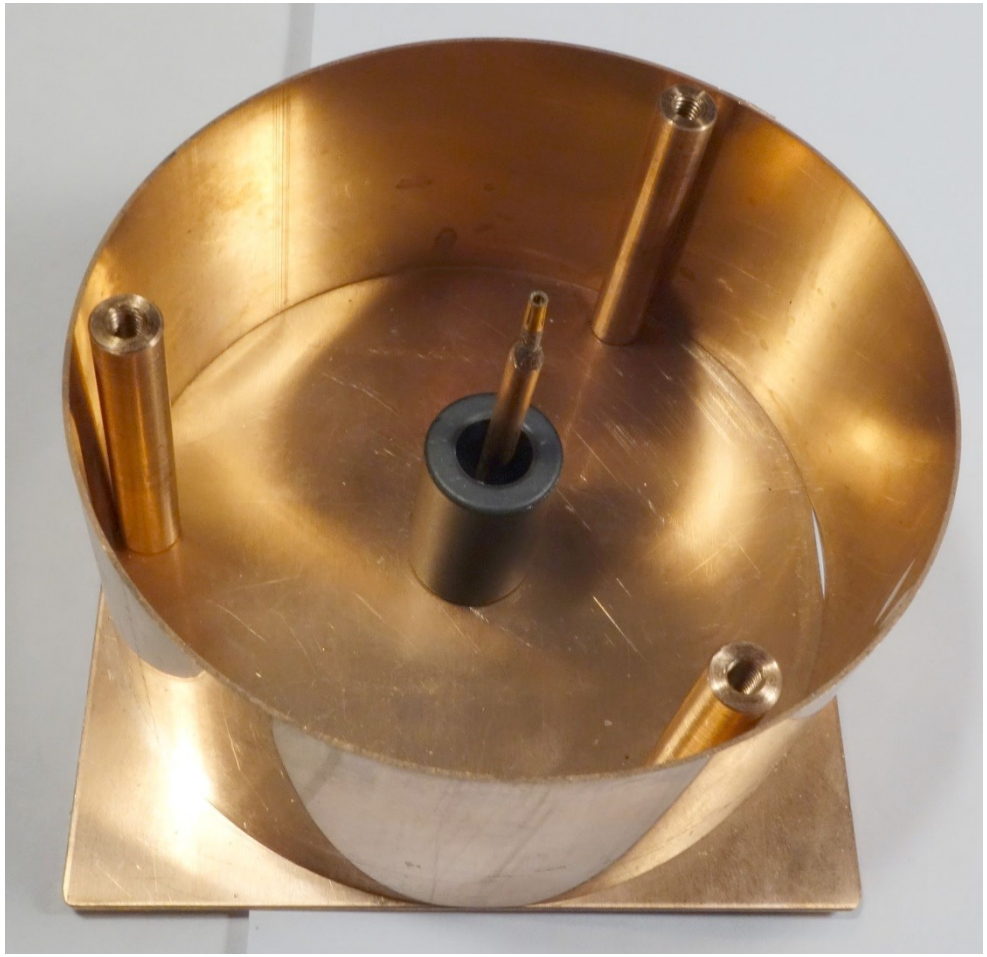


# De Meetkamer

Whitham D. Reeve, Tom Hagen en Kurt Poulsen



# De Meetkamer van PA0HKZ



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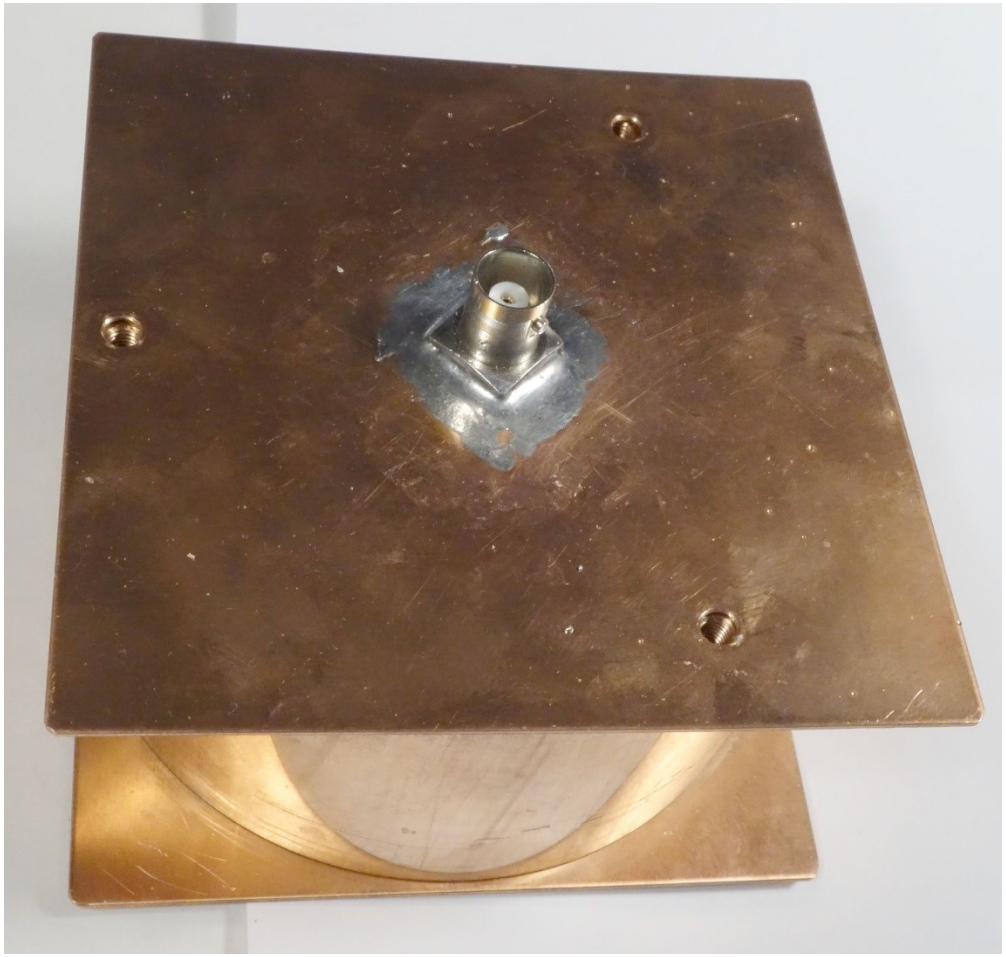

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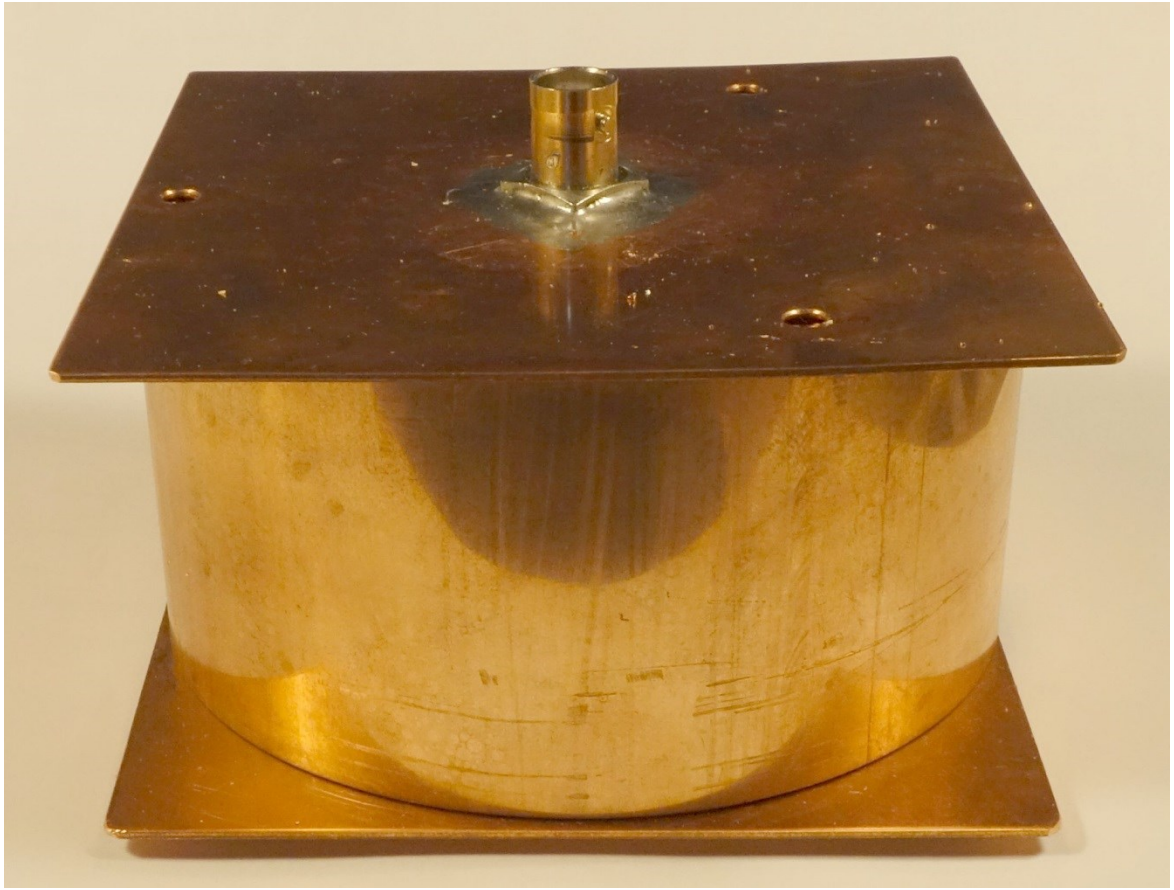

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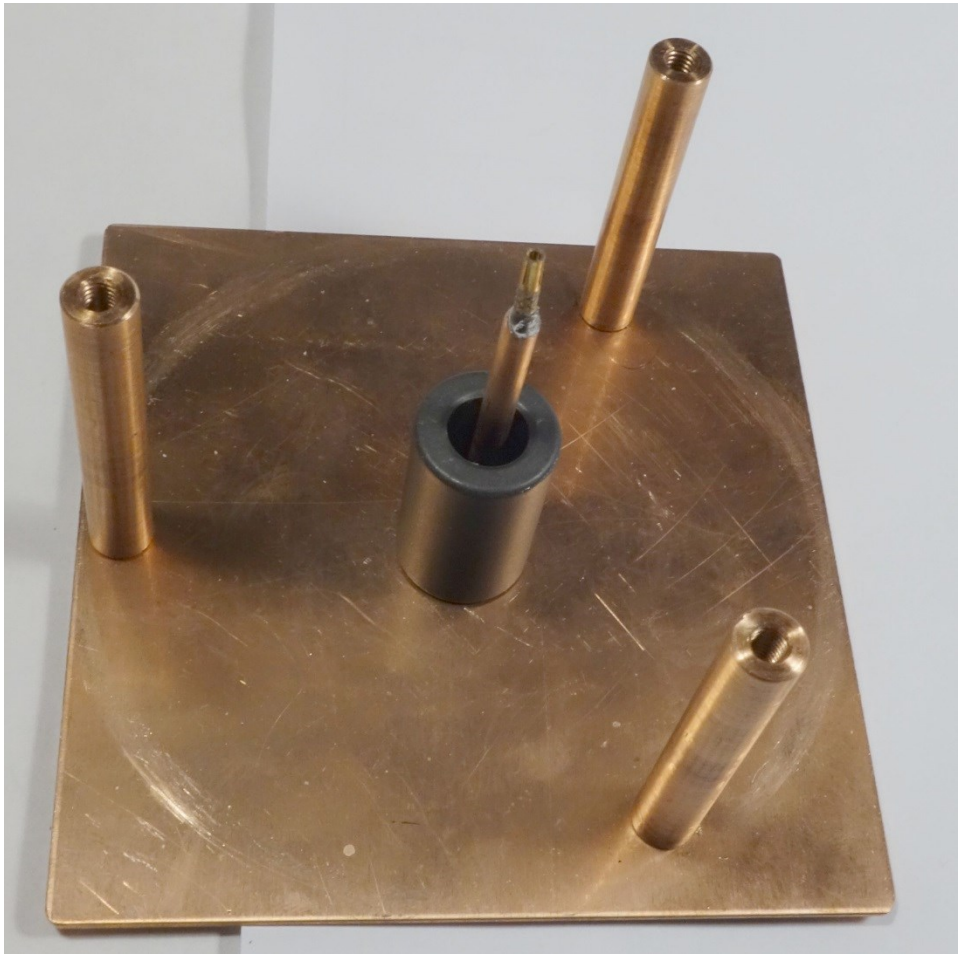

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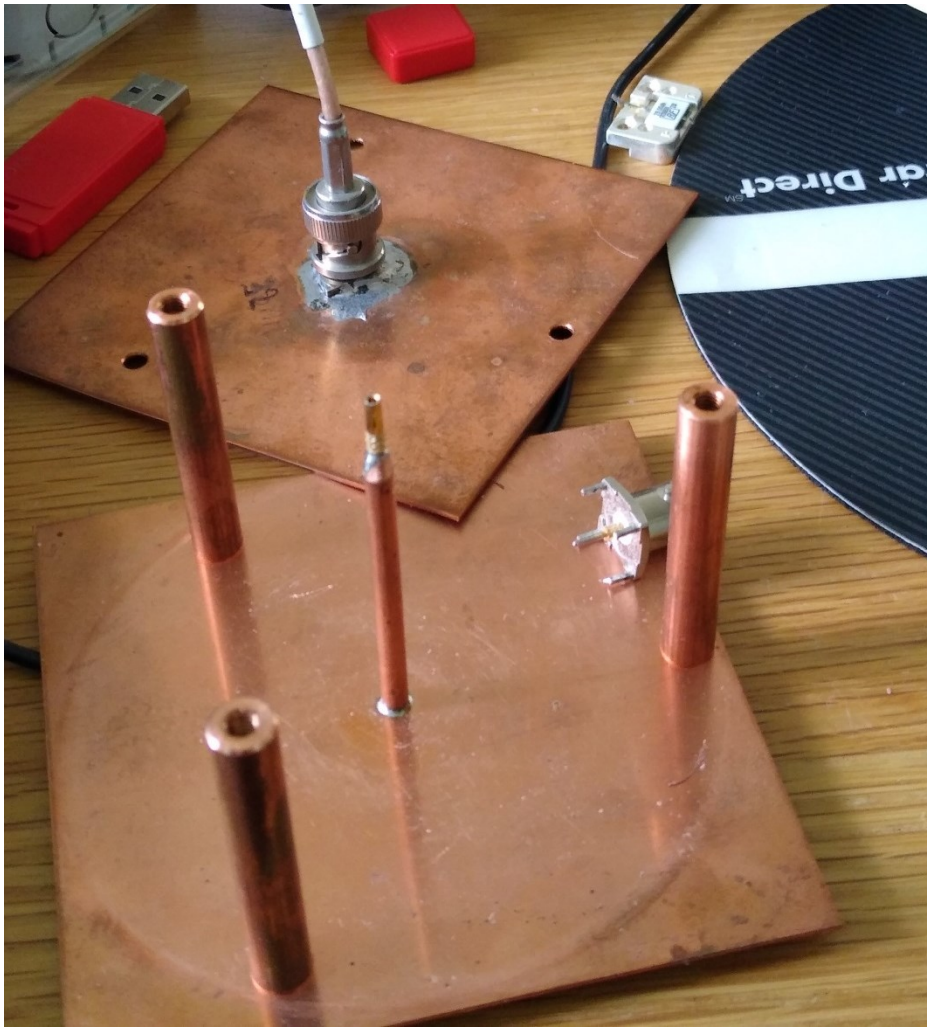

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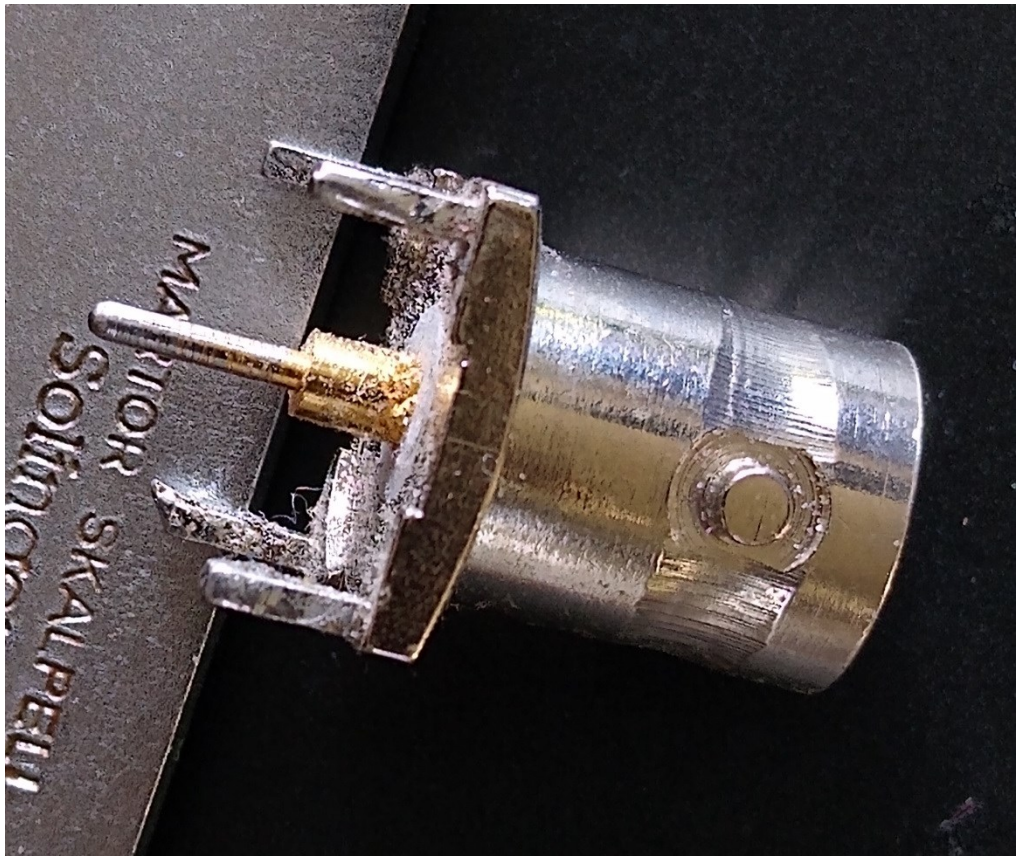
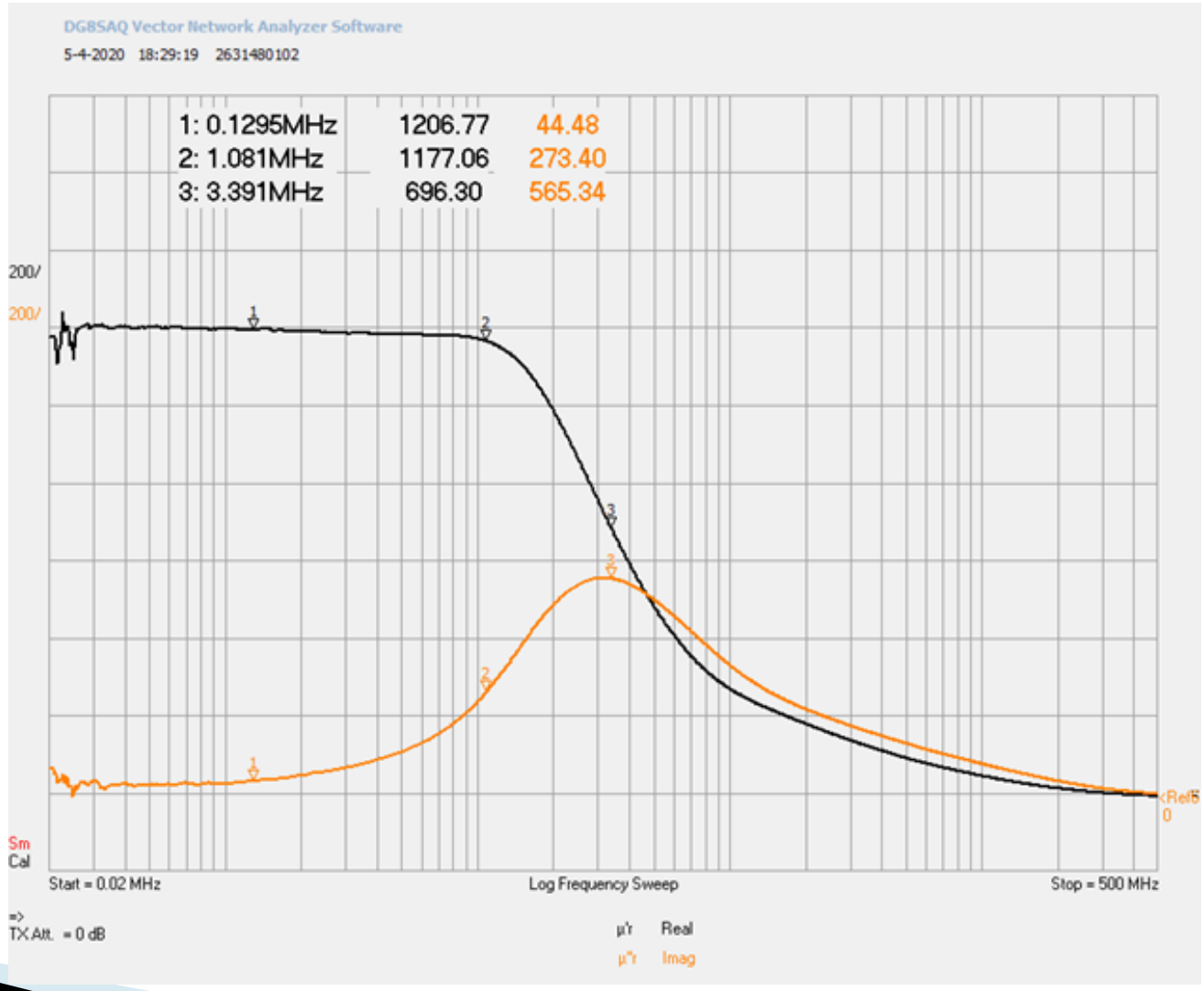


# De Meetkamer van PA0HKZ

# De Meetkamer

- We willen graag  ‘Fair Rite’ grafieken.
- Maar dan mooier.

# Meetkamer van PA0HKZ



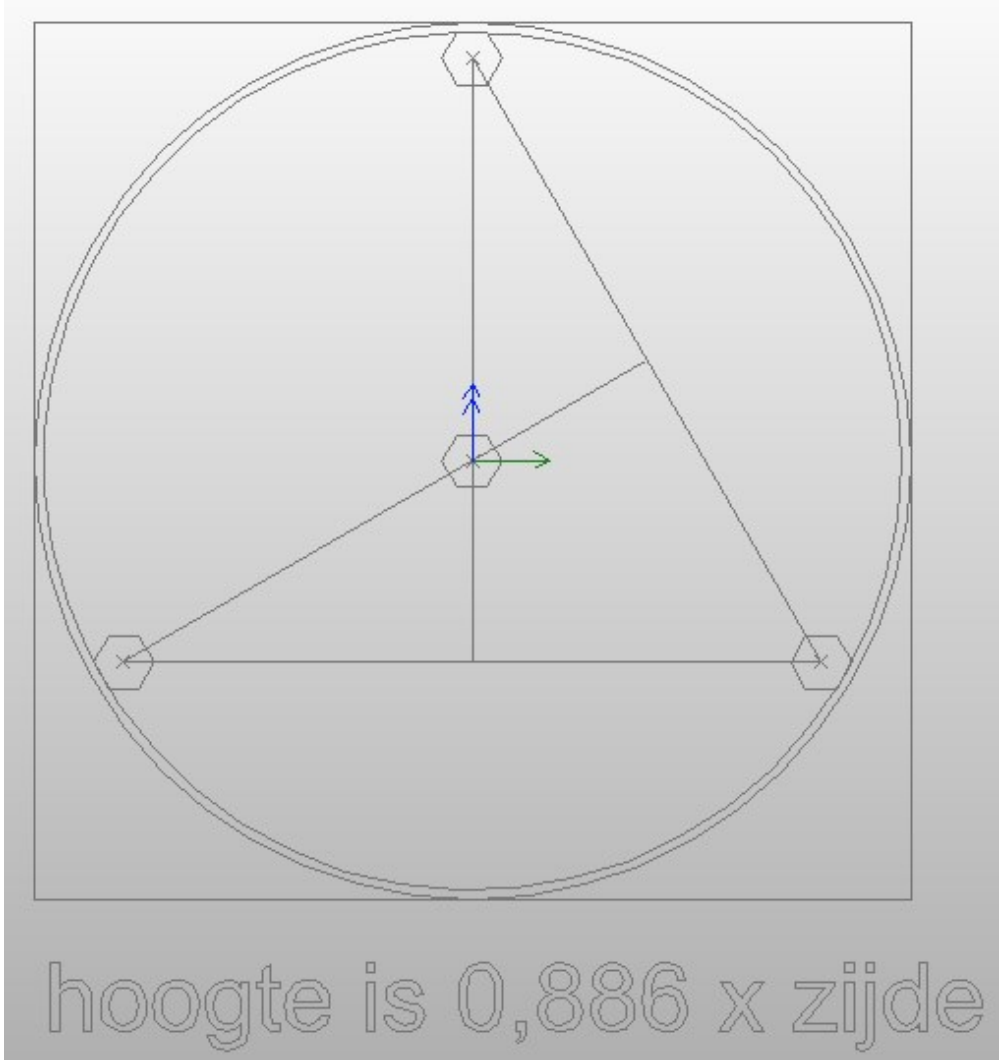
# Hulde aan professor Baier

- Vraag: Hoe bereken je μ’ en μ’’ uit $S_{11}$?
- Mailtje werd binnen een dag beantwoord.

- Hi Henk,
- IN3OTD uses two different methods to measure the core permeability:
- a) By inductance measurement of a coil
- b) By measuring wave parameters of a transmission line filled with the ferrite.
- The math involved in b) is quite complex, i.e. you use some software like zplots to extract waveguide parameters and then calculate the permeability and dielectric constant from these.
- The method a) is quite simple, though:
- The inductance of a coil with n turns on a toroid is calculated to be

- L=u_0*u_r*n^2*A/Length
- Where
- u_0= magnetic field constant = 4*pi*10^-7 Newton/Ampere^2
- u_r = permeability=u'+j*u'' which you are after
- A= cross sectional area of the core
- Length = magnetic path length, i.e. average circumference of the core
- So, if you measure the impedance of a coil wound onto the core you will obtain
- Z=j*w*L
- Actually, with a VNA you measure S11. But you can calculate Z from S11 with the VNWA function s2z(s11).
- So, you can solve the whole thing for u_r:
-
- u_r=s2z(s11)*Length/(j*w*u_0*n^2*A)
-
- Copy above formula into a VNWA custom trace and display the real part and the imaginary part of the result.
- Hope this is helpful.
- Best regards,
- Tom

# Meetkamer zelf bouwen

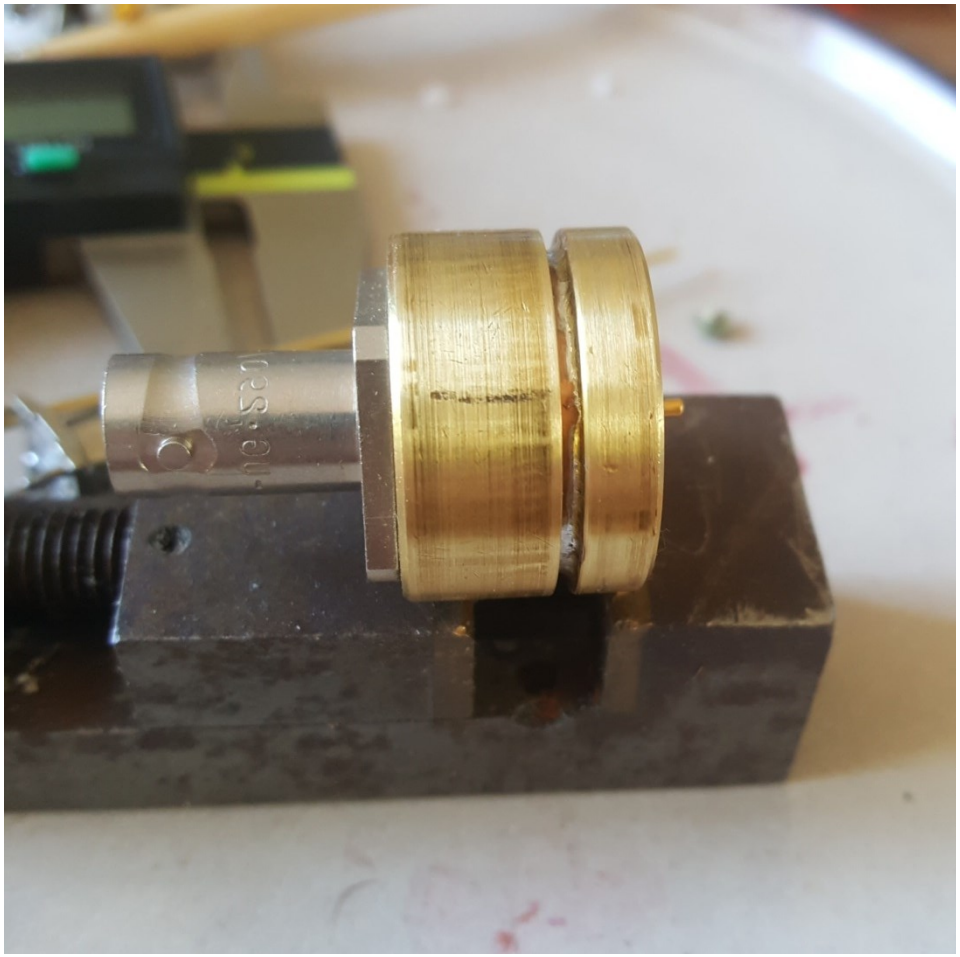


# De Meetkamer

- Stuklijst

2 koperen of messing plaatjes 100x100x1,5
3 afstandbussen 6-kant sw6 x 60
BNC connector voor print montage
60mm 100 rond koperen regenpijp
60 mm 3 of 4 mm rond koper staf

# De Minimeetkamer PA0HKZ



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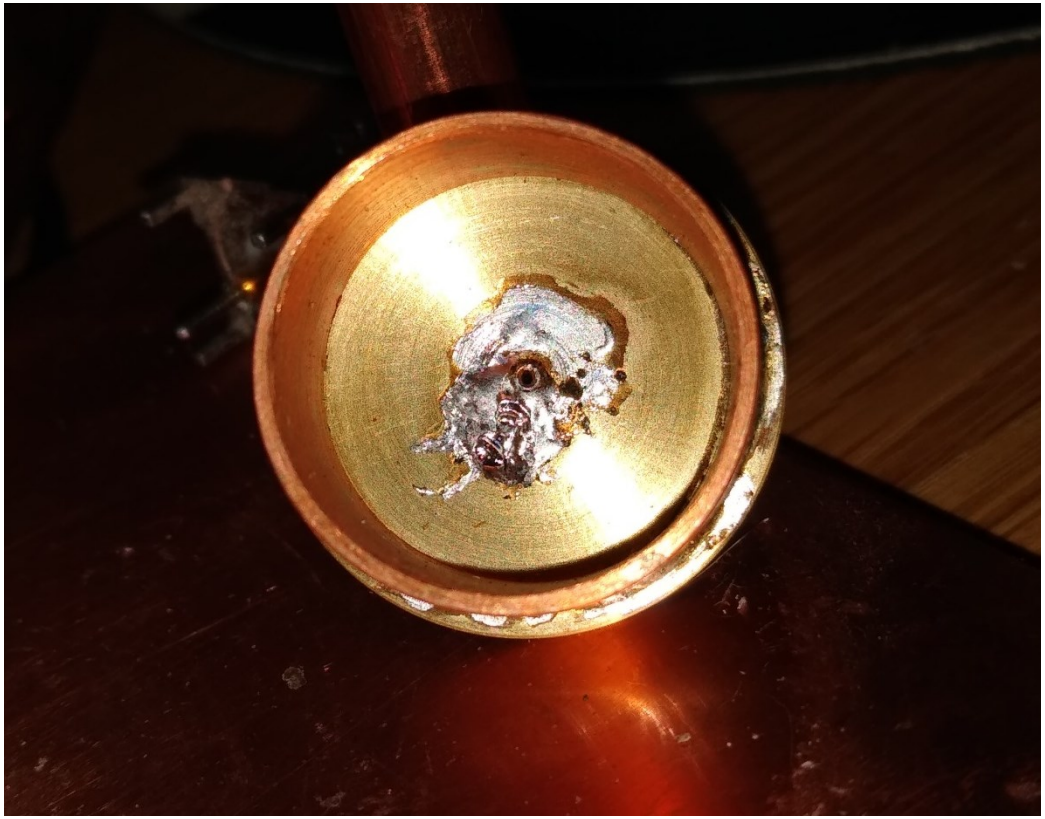

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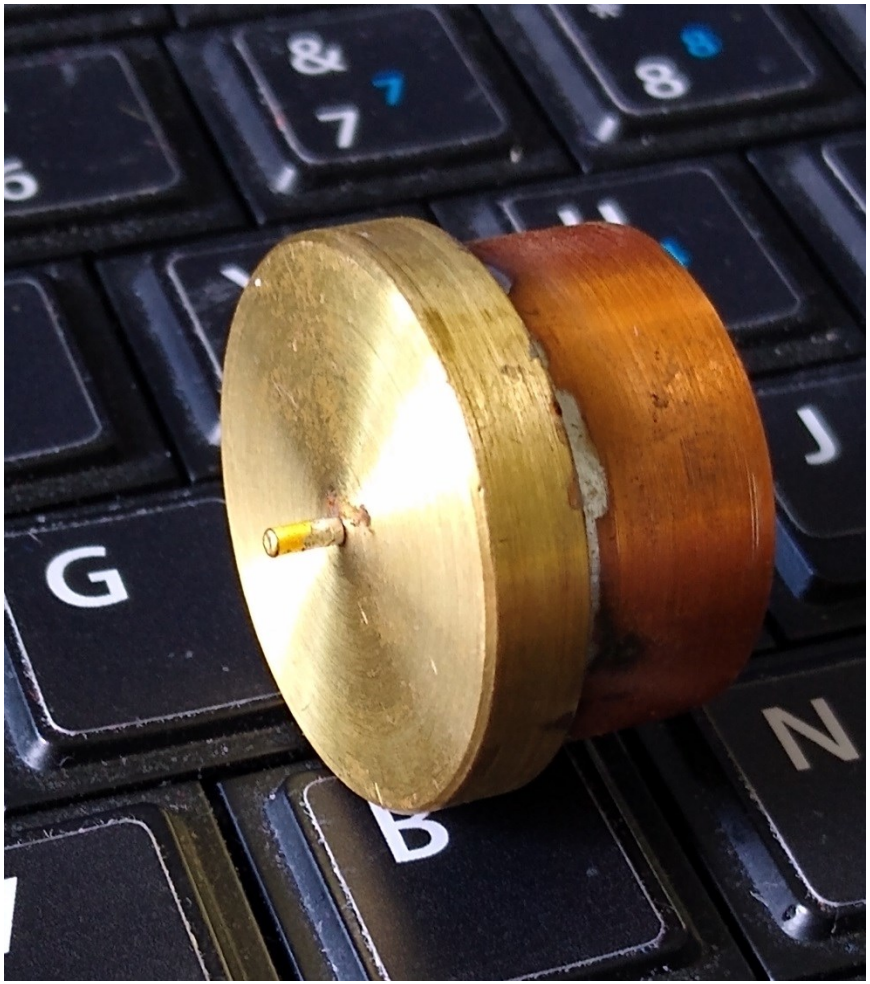

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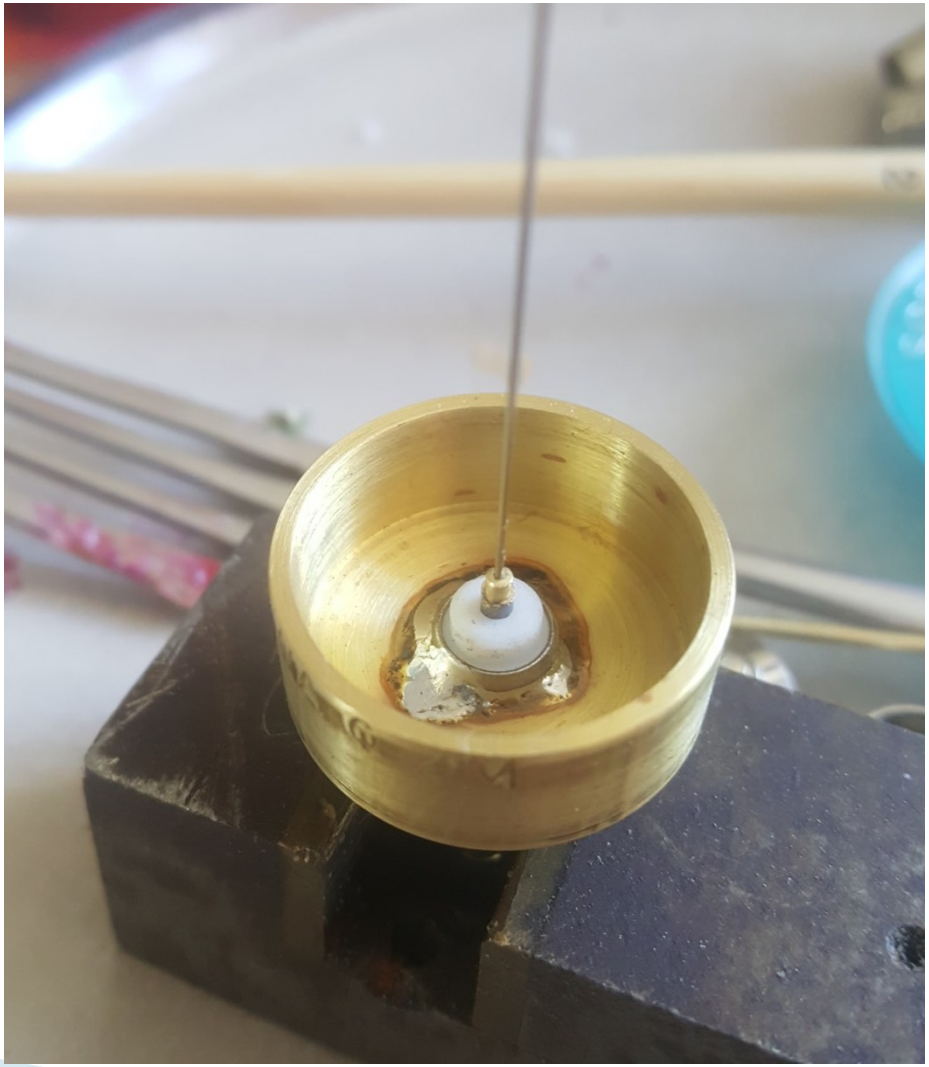

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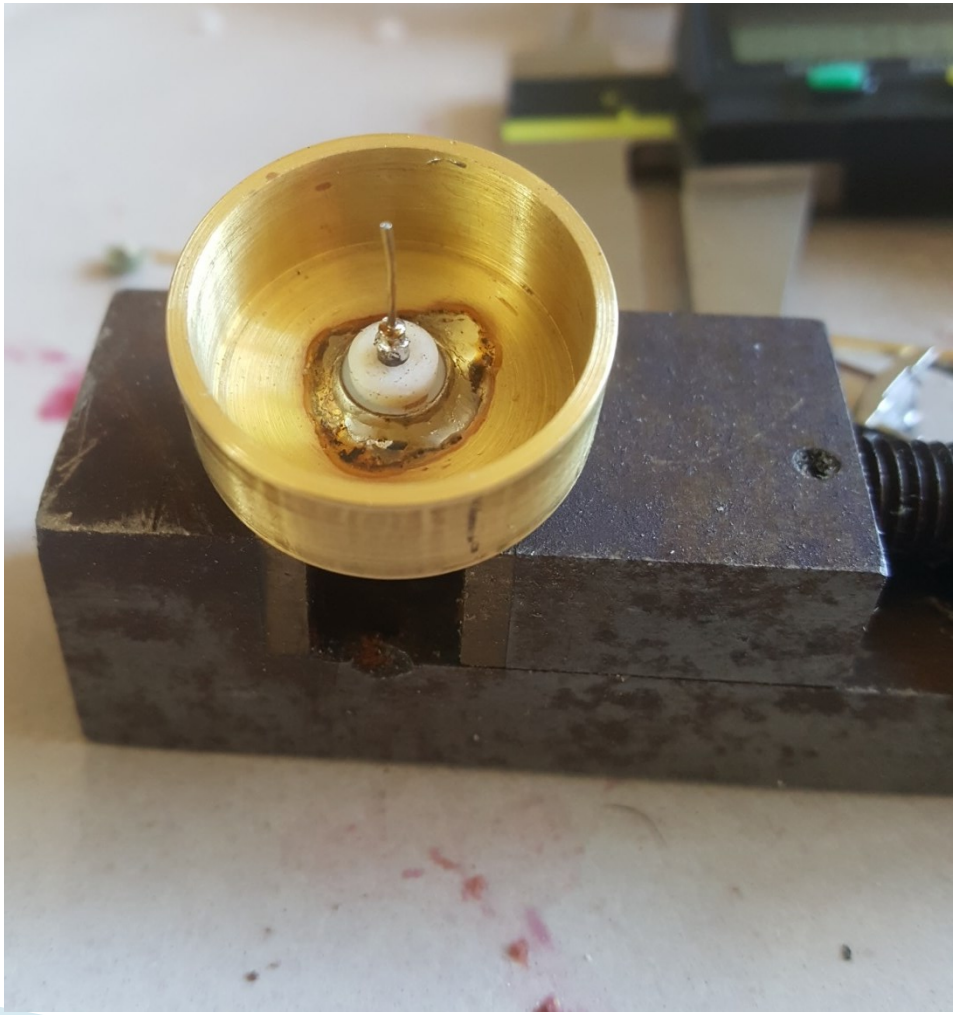


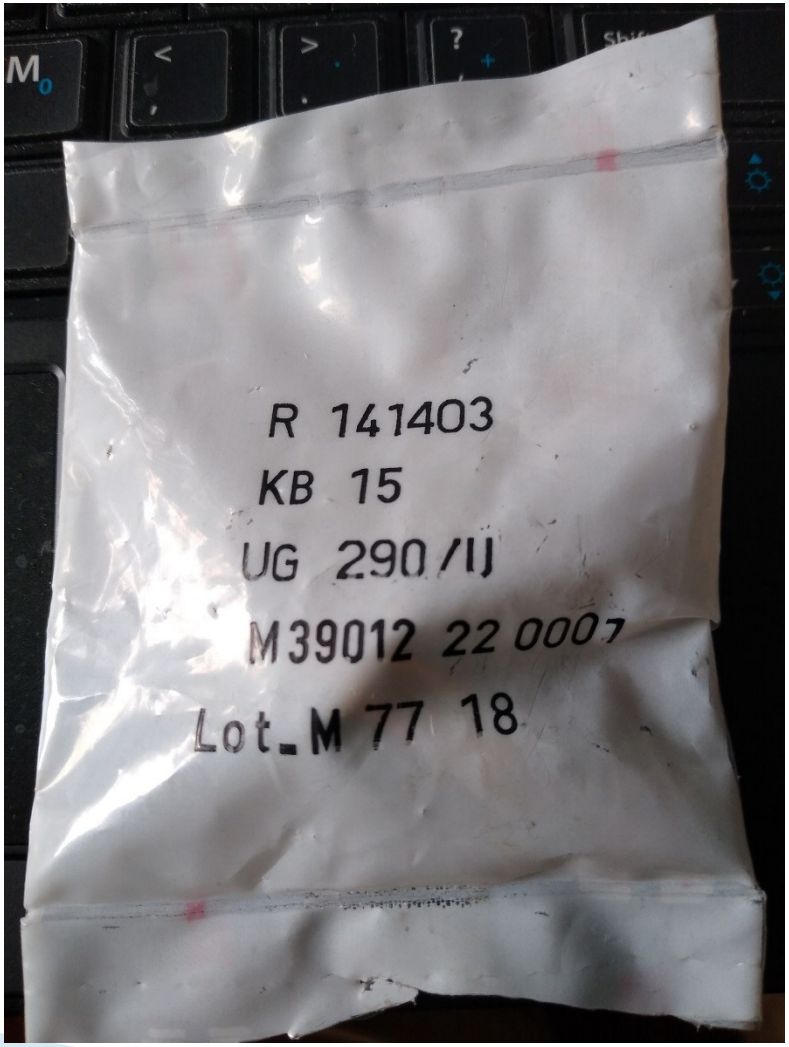
# De Minimeetkamer PA0HKZ

# De Meetkamer

Stuklijst minimeetkamer

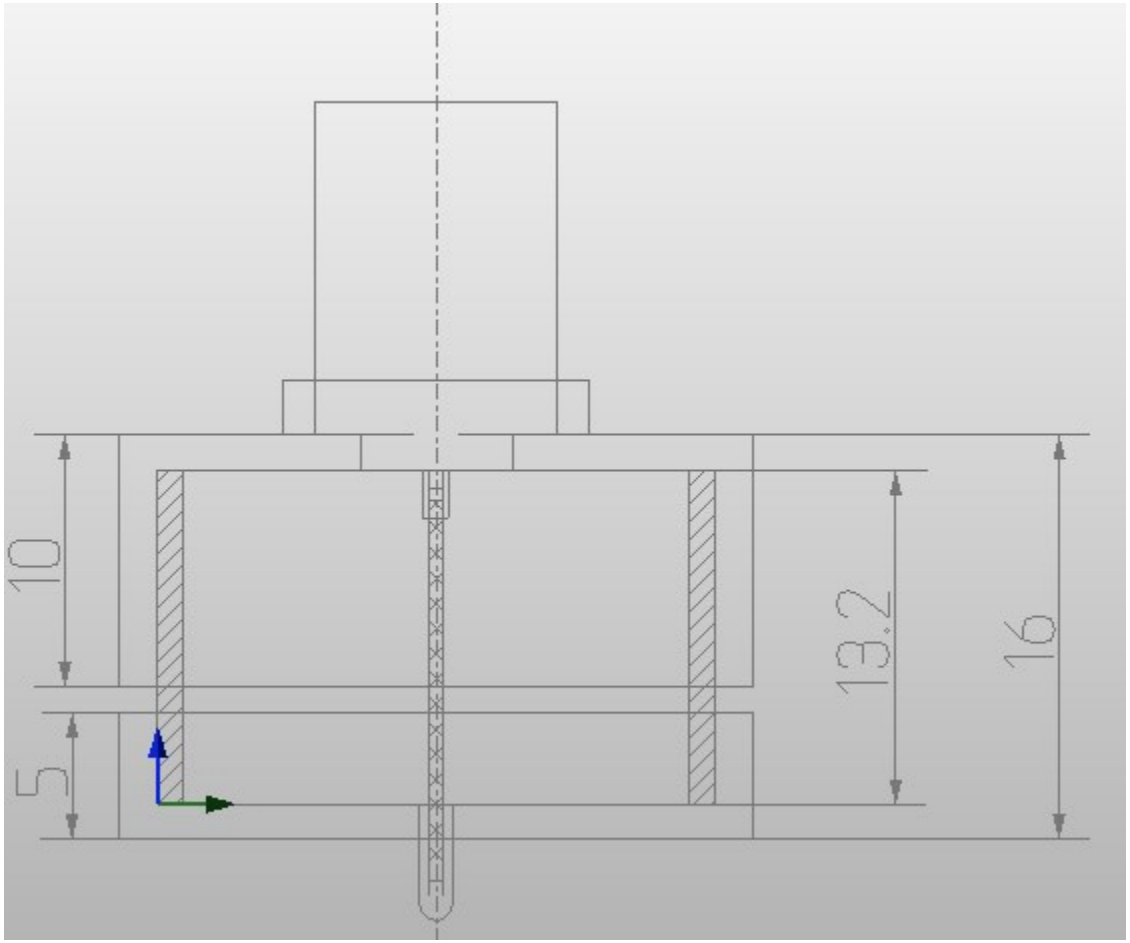
- 22 mm waterleidingbuis 13,2 mm lang
- 2 einddoppen 22 mm
- BNC connector chassismontage
- Test pennetje 0,5mm
- Stukje buis 0,5mm Zilver-Nikkel,  paar cm

# De Minimeetkamer PA0HKZ



# De Meetkamer

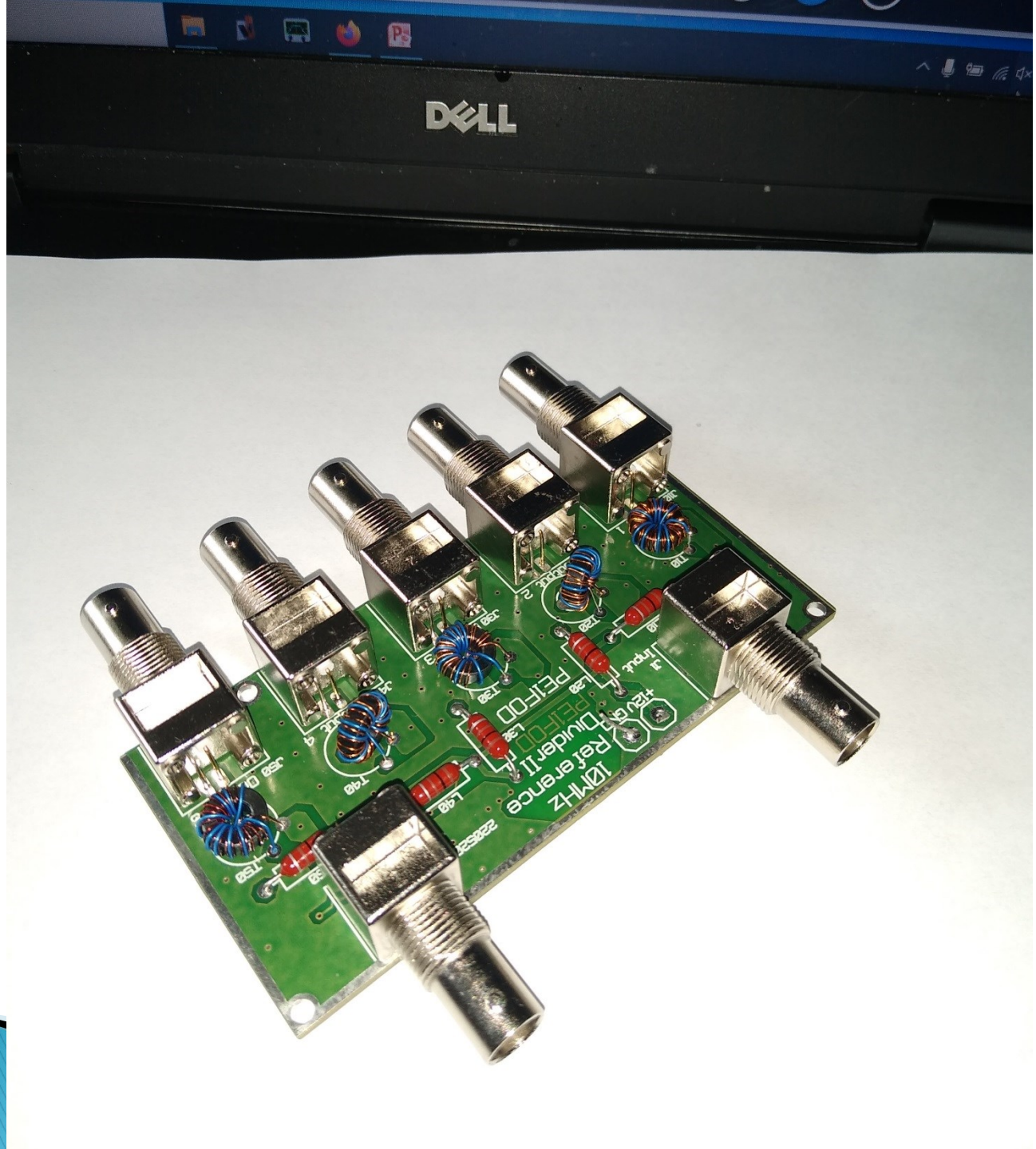
- Mini meetkamer PA0HKZ

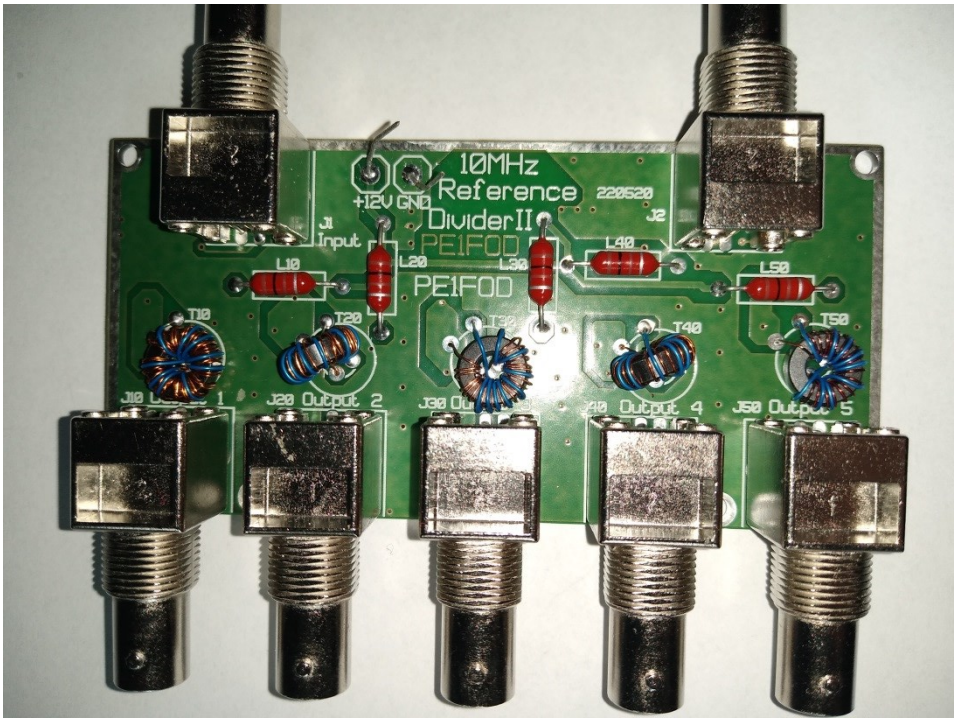


# De Meetonvanger

- Veel plezier met meten!

# Ik zoek een Perseus ontvanger


DELL
10MHz
Reference
Divider II
PE1FOD
+12V
Input


10MHz
Reference
220520
Divider II
PE1FOD
+12V GND
J1
Input
J2
L10
L20
L30
L40
L50
PE1FOD
T10
T20
T30
T40
T50
J20 Output 2
J50 Output 5