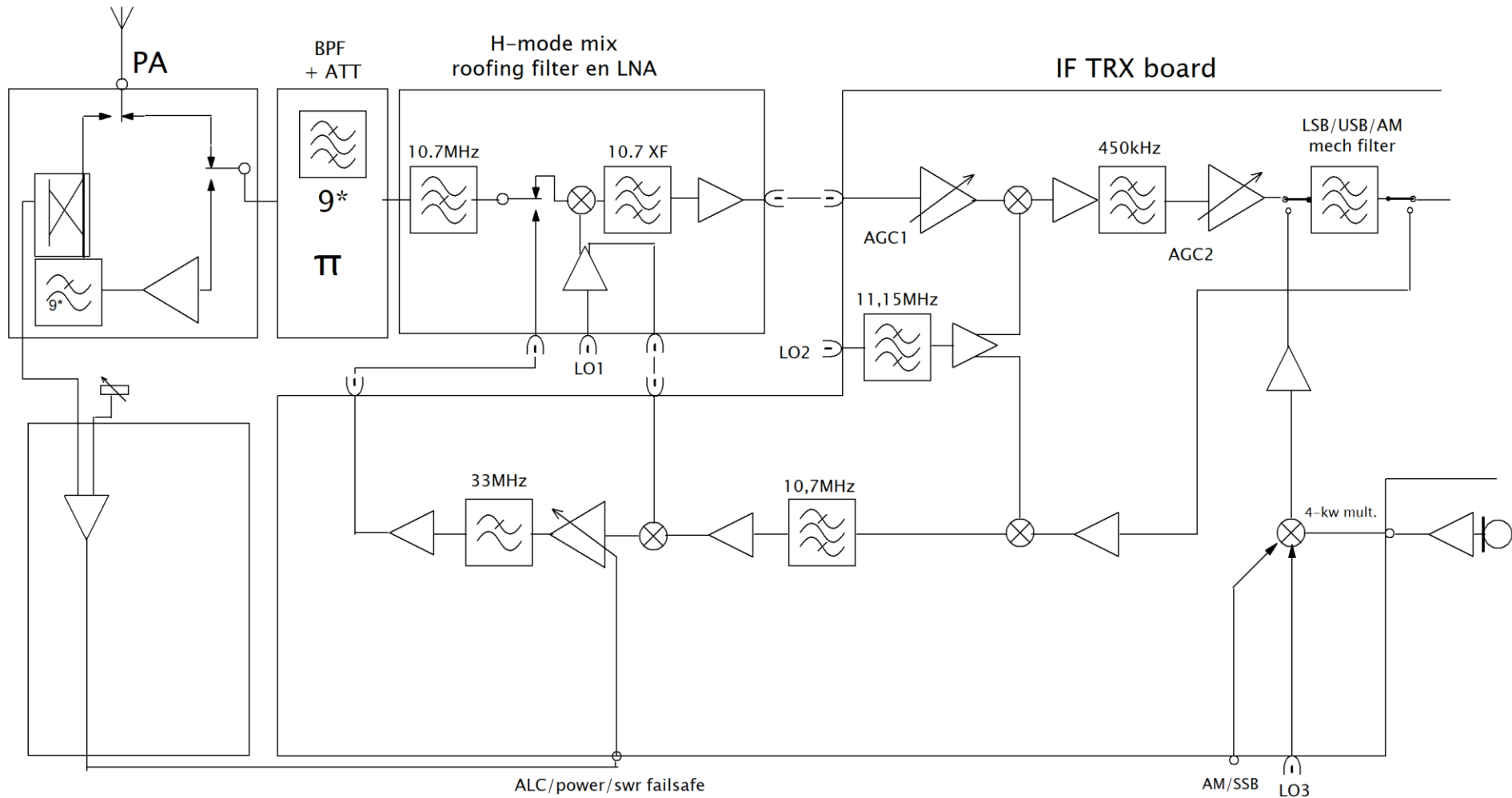


Ontwerp en bouw van een HF transceiver

PA0VRE

- Modes: AM USB LSB (CW)
- 9 HF banden.
- Zo veel mogelijk uit de junkbox gebruiken.
- IF tx en rx naar buiten uitvoeren voor externe digitale IF sectie.
- 10MHz ext. Ref. van GPS + interne TCXO (naar keuze).
- 4 maal DDS voor LO# 1,2 en 3 en AUX voor externe UHF SHF toepassingen.
- Ca. 50W TX vermogen en SWR beveiliging.
- Arduino Nano controller + SW van Martin, PE1BIW .
- 13,5V DC externe voeding.
- Compacte opbouw.

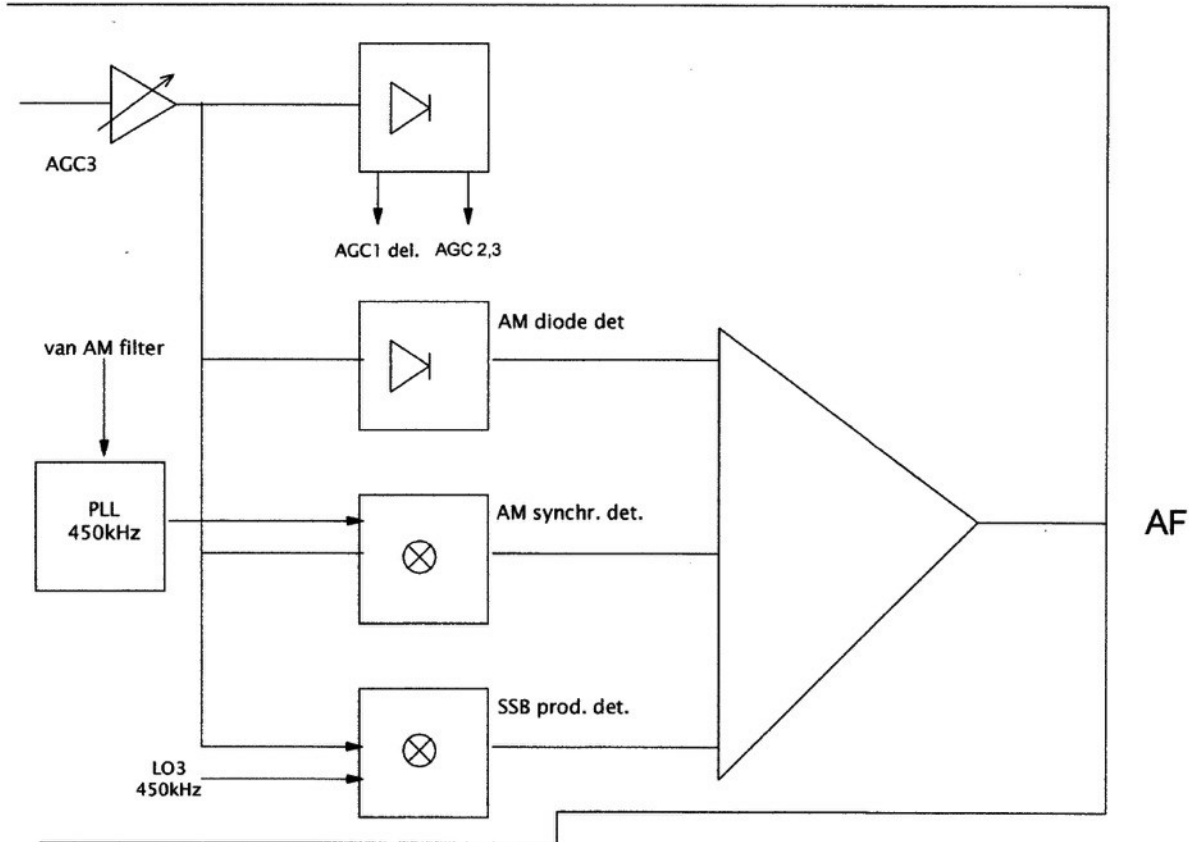
Concept keuze



concept HF TRX PA0VRE

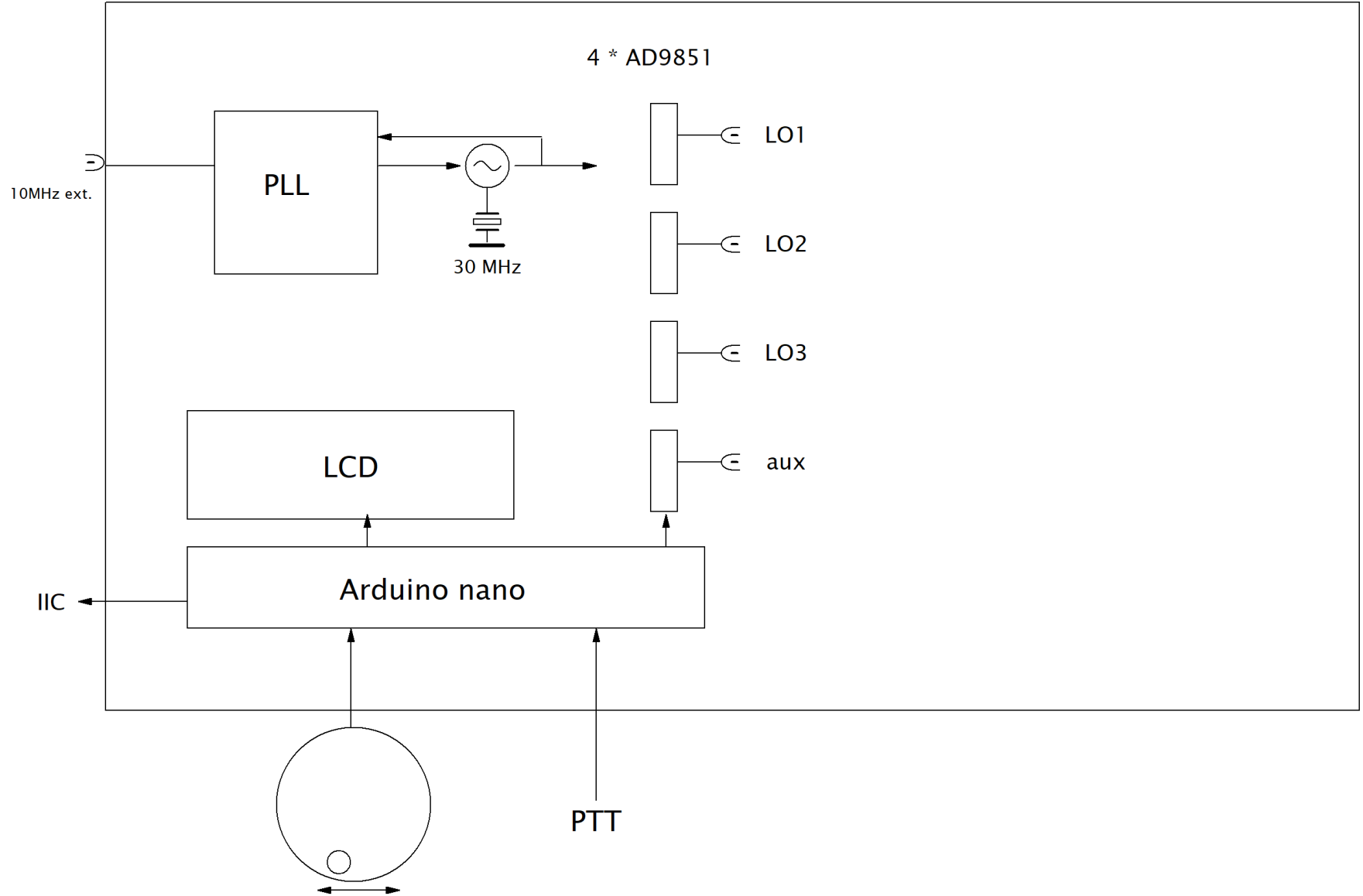
Concept keuze

IF TRX board



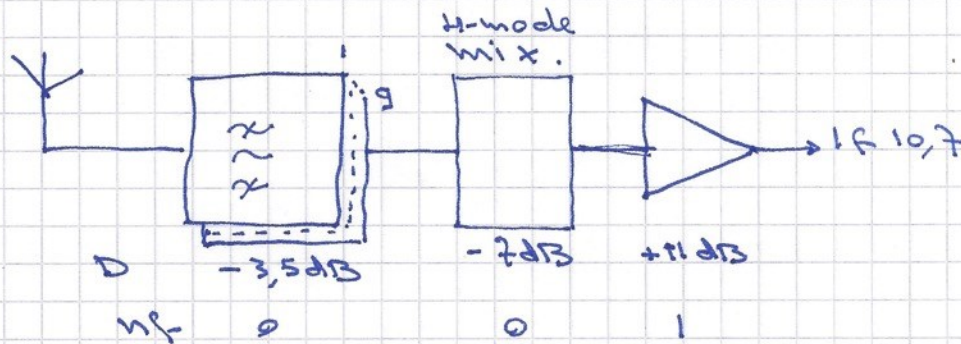
Concept keuze

LO opwekking en besturing



Benadering gevoeligheid

Gevoeligheid HF ontvanger ovr:



$$NF_{\text{totaal}} \approx 11 \text{ dB}$$

$$B = 2,5 \text{ kHz} \rightarrow 10 \log(2500) = +34 \text{ dB} \quad \text{for } B = 1 \text{ Hz}$$

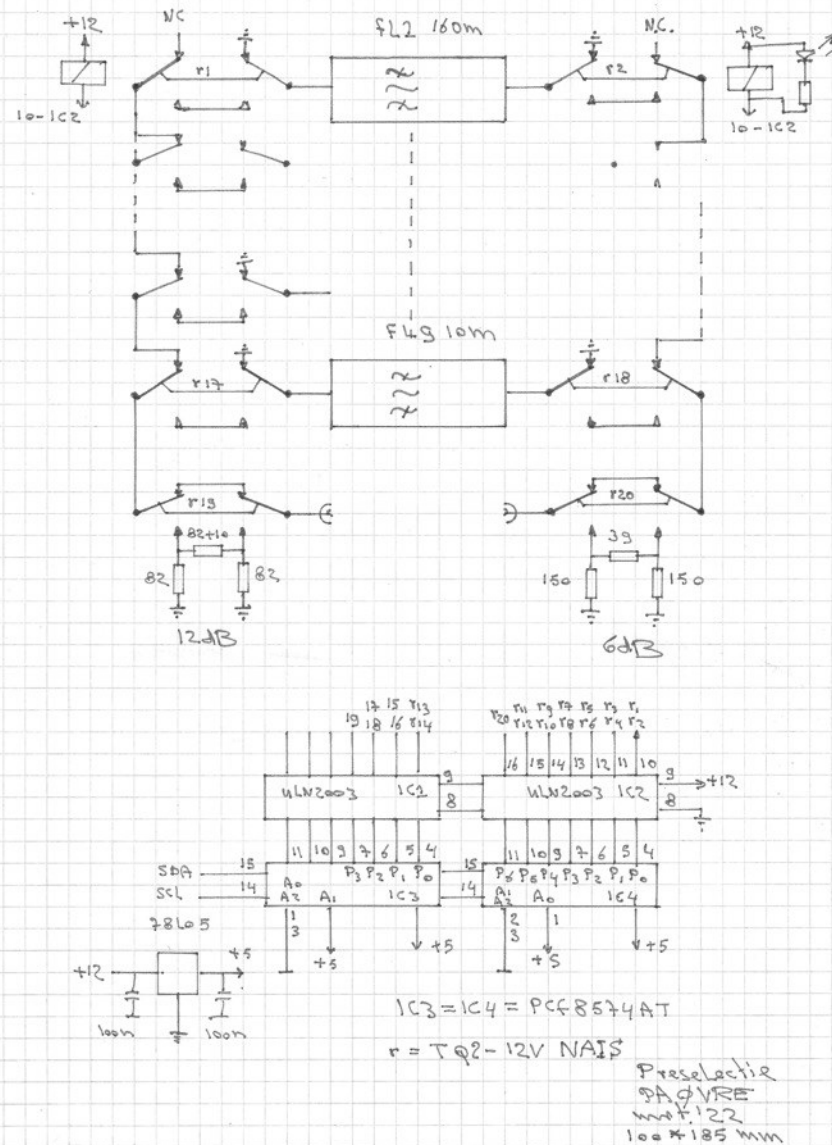
$$P_{\text{ruis}} = -174 + 34 + 11 = -129 \text{ dBm} \hat{=} 1,259 \cdot 10^{-16} \text{ W}$$

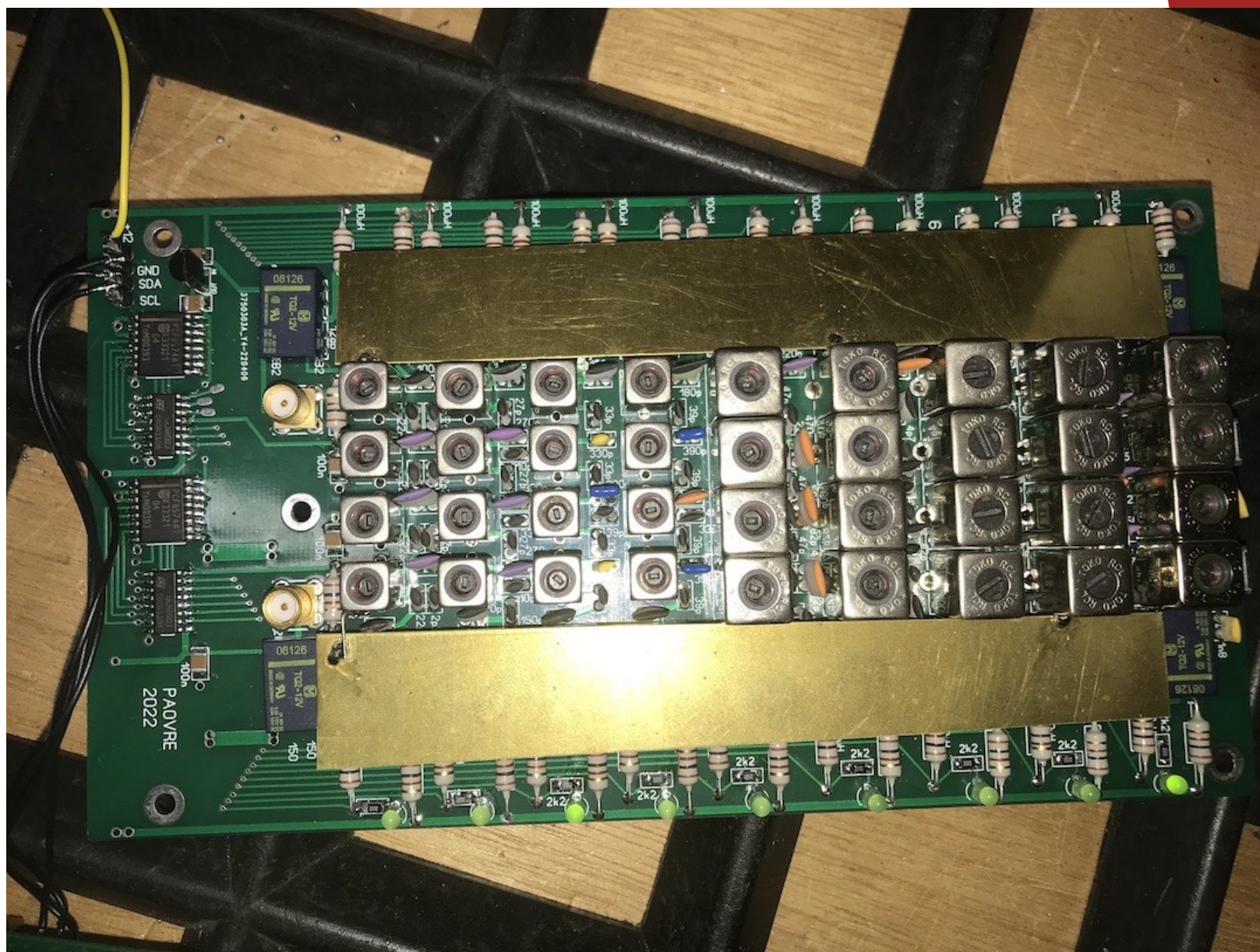
$$\text{in } Z = 50 \Omega \text{ is de ruis spanning } \sqrt{P \cdot Z} = \sqrt{1,259 \cdot 10^{-16} \cdot 50} =$$

$$79 \text{ nV} \text{ of } 0,08 \mu\text{V} \quad 10 \text{ dB bovenderuis vereist } U_{\text{in}} =$$

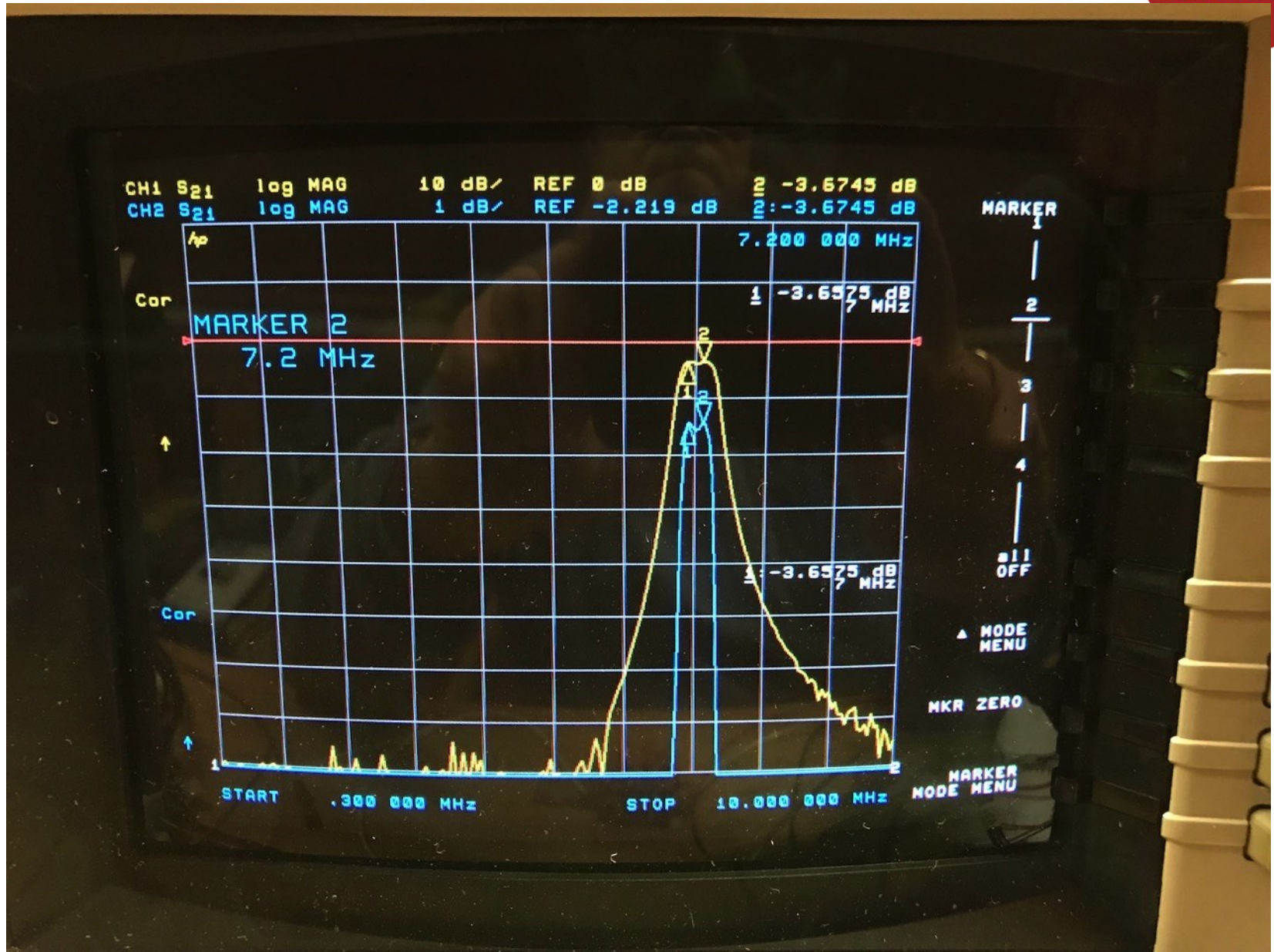
$$0,08 \mu\text{V} \cdot 10^{\frac{10}{20}} = 0,25 \mu\text{V}$$

Preselectie opzet

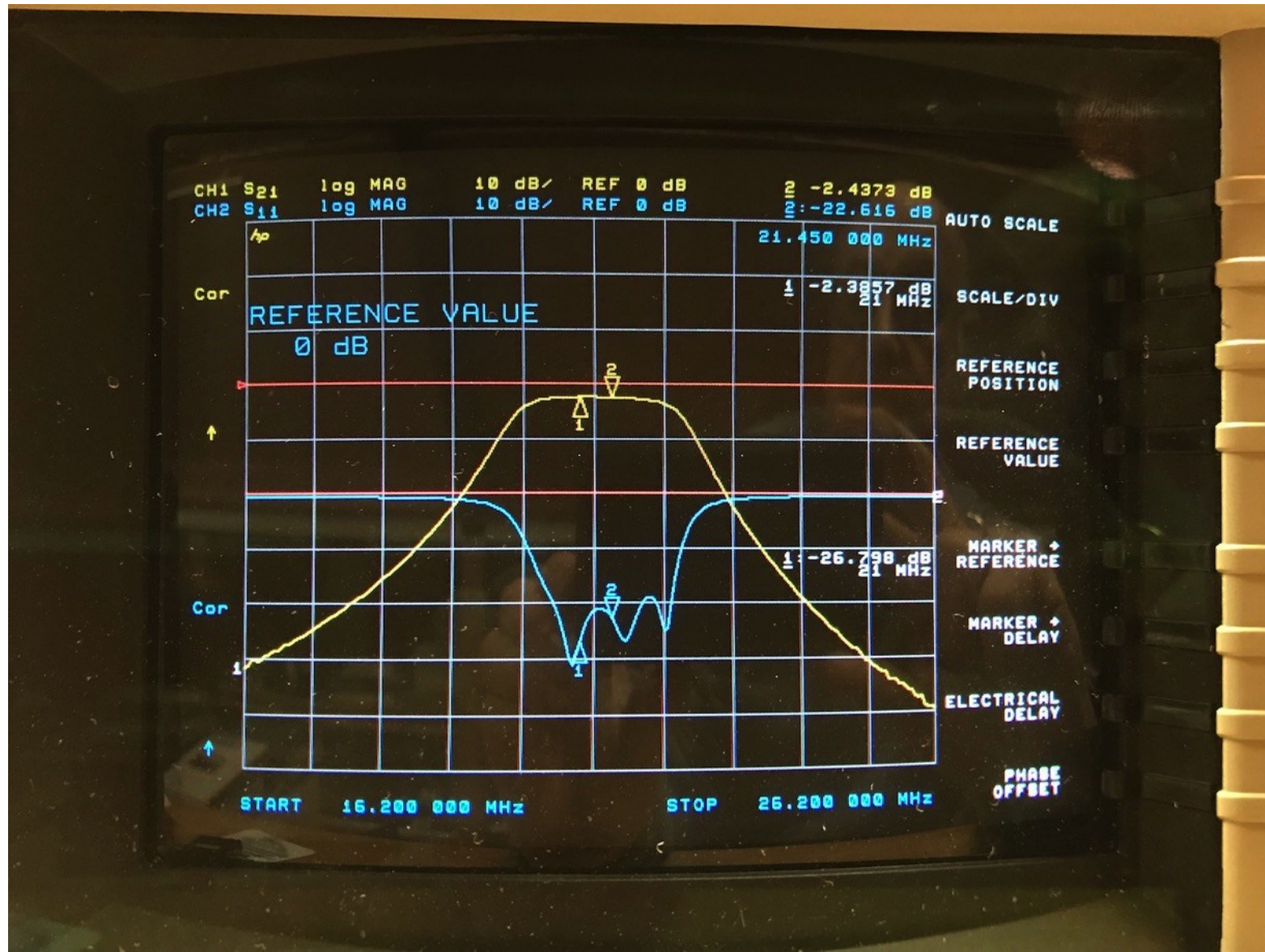




40m bandpass filter



15m bandpass filter



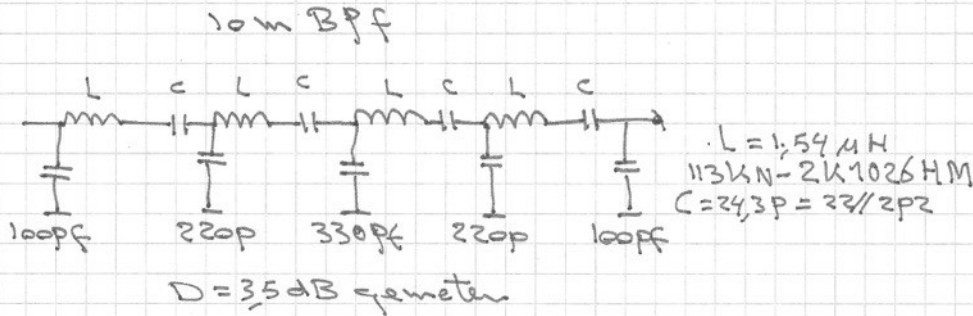
Topologie en simulatie-optimalisatie

Simulatie 10m preselectie

22-FEB-122

COMPACT SOFTWARE - ARRL Radio Designer 1.0
File: c:\arrl\bpf15.ckt

211



- * bpf 28MHz
- * $Z=50$ ohm in en uit

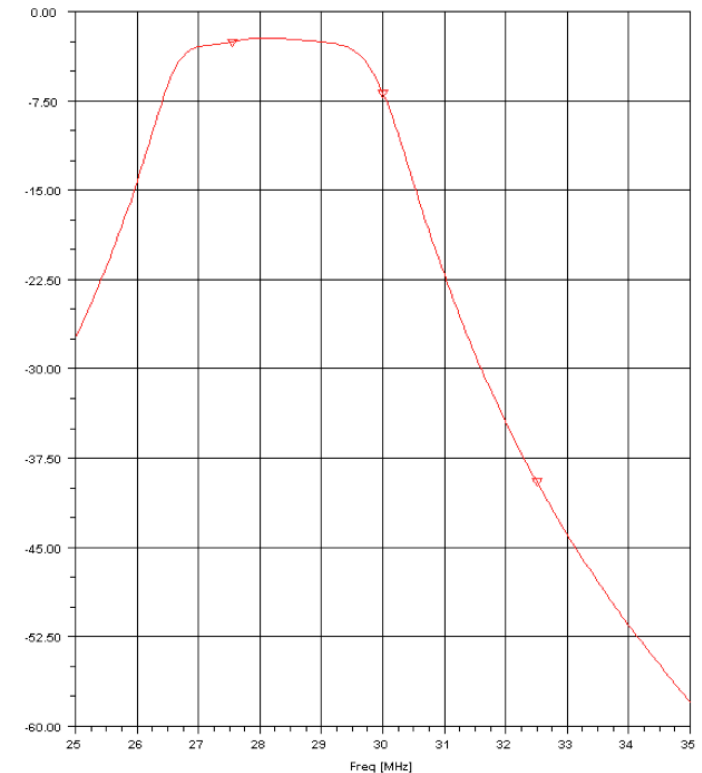
blk

cap 1 c=110pF
slc 1 2 l=1.54uH Q=100 F=28MHz c=24.3pF
cap 2 C=243pF
slc 2 3 l=1.54uH Q=100 F=28MHz c=24.3pF
cap 3 c=317pF
slc 3 4 l=1.54uH Q=100 F=28MHz c=24.3pF
cap 4 c=243pF
slc 4 5 l=1.54uH Q=100 F=28MHz c=24.3pF
cap 5 C=110pF

bpf10M:2POR 1 5
END

FREQ
STEP 25MHz 35MHz .05MHz
END

MS21 [dB] BPF10M



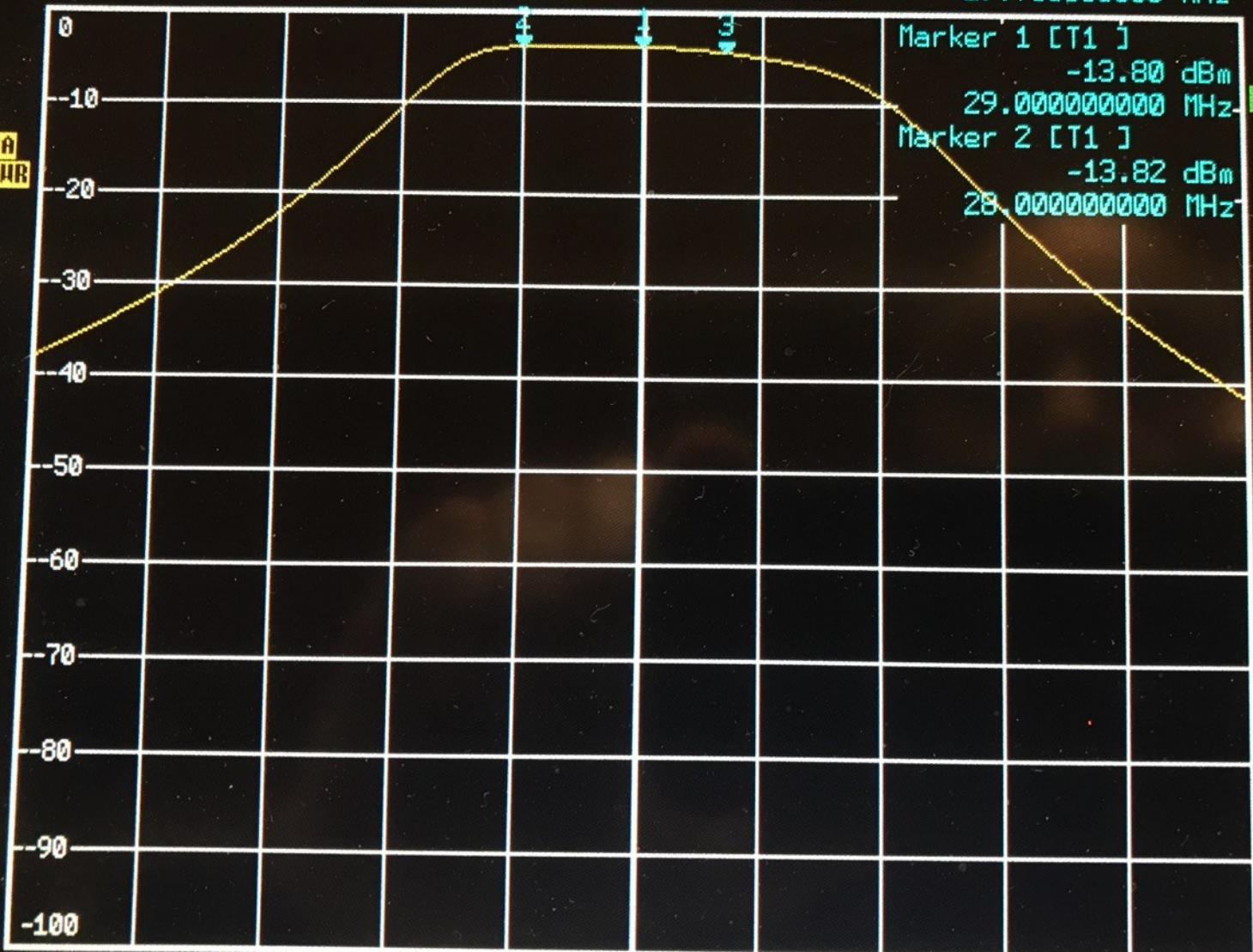


MARKER 3
29.7 MHz dBm
Ref -10 dBm Att 20 dB

*RBW 10 kHz
VBW 30 kHz
SWT 500 ms

Marker 3 [T1]
-14.40 dBm
29.700000000 MHz

1 SA
CLRNR



Center 29 MHz

1 MHz/

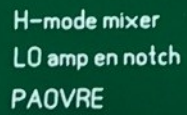
Span 10 MHz

SPECTRUM

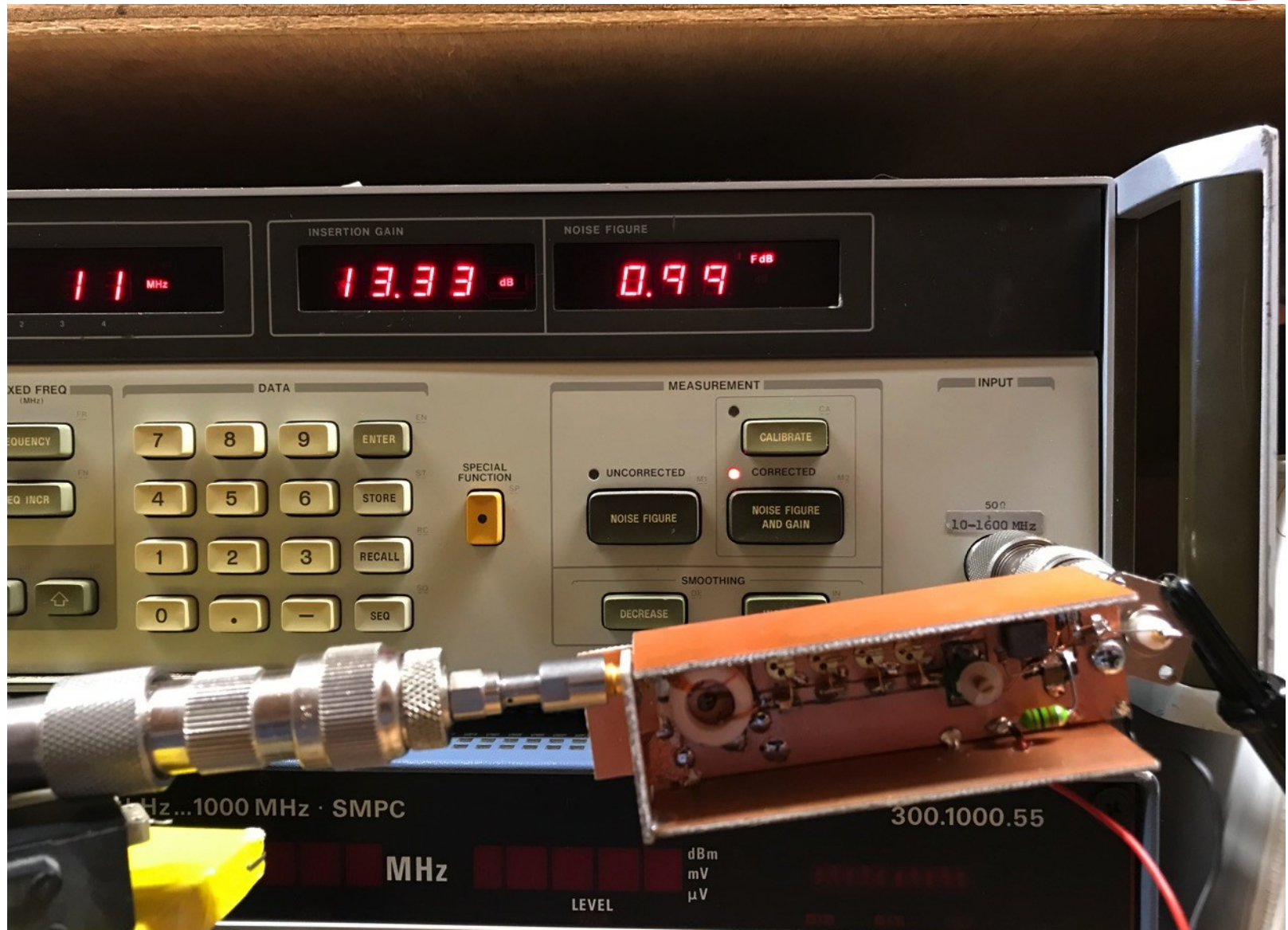
NETWORK

SCREEN R

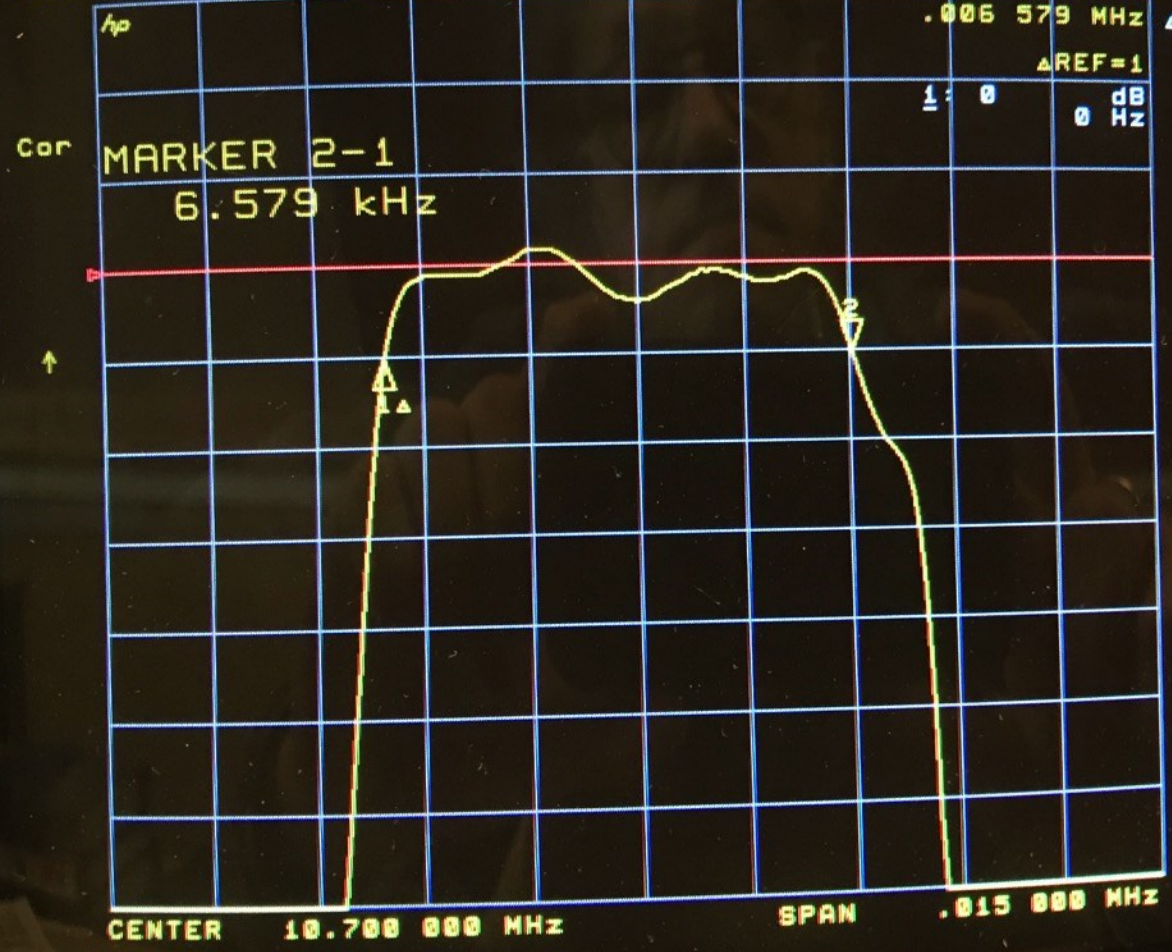
ALL MARKER
OFF



Postmix amplifler met 4 maal U310 van W7AAZ



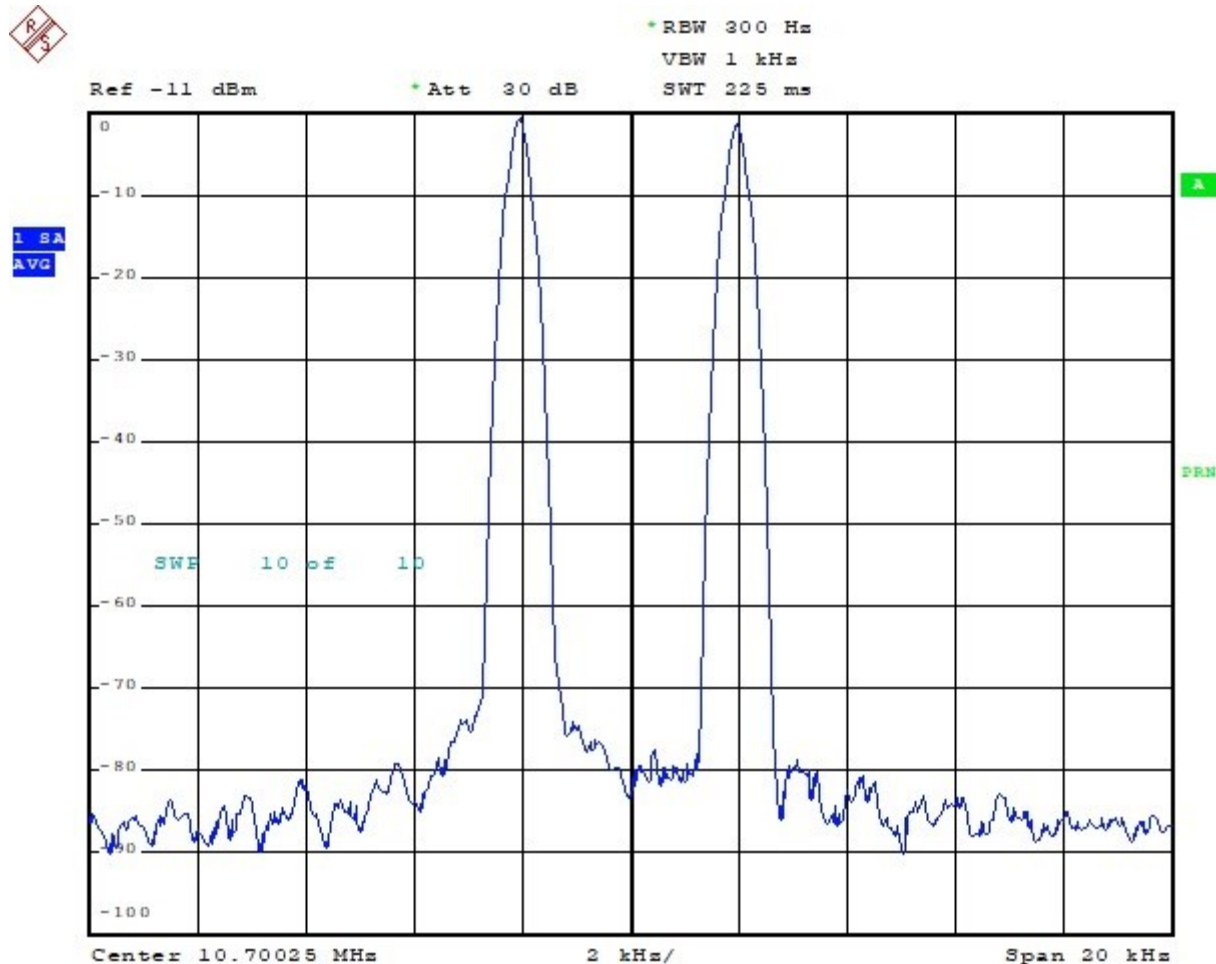
CH1 S21 log MAG 1 dB/ REF -2 dB 2: .0120 dB



MARKER
REF = 1
2
3
4
all
OFF
MODE
MENU
MKR ZERO
MARKER
MODE MENU

IMA₃ H-mode mixer

IP_{3 in} > 37 dBm, 45 wordt gespecificeerd



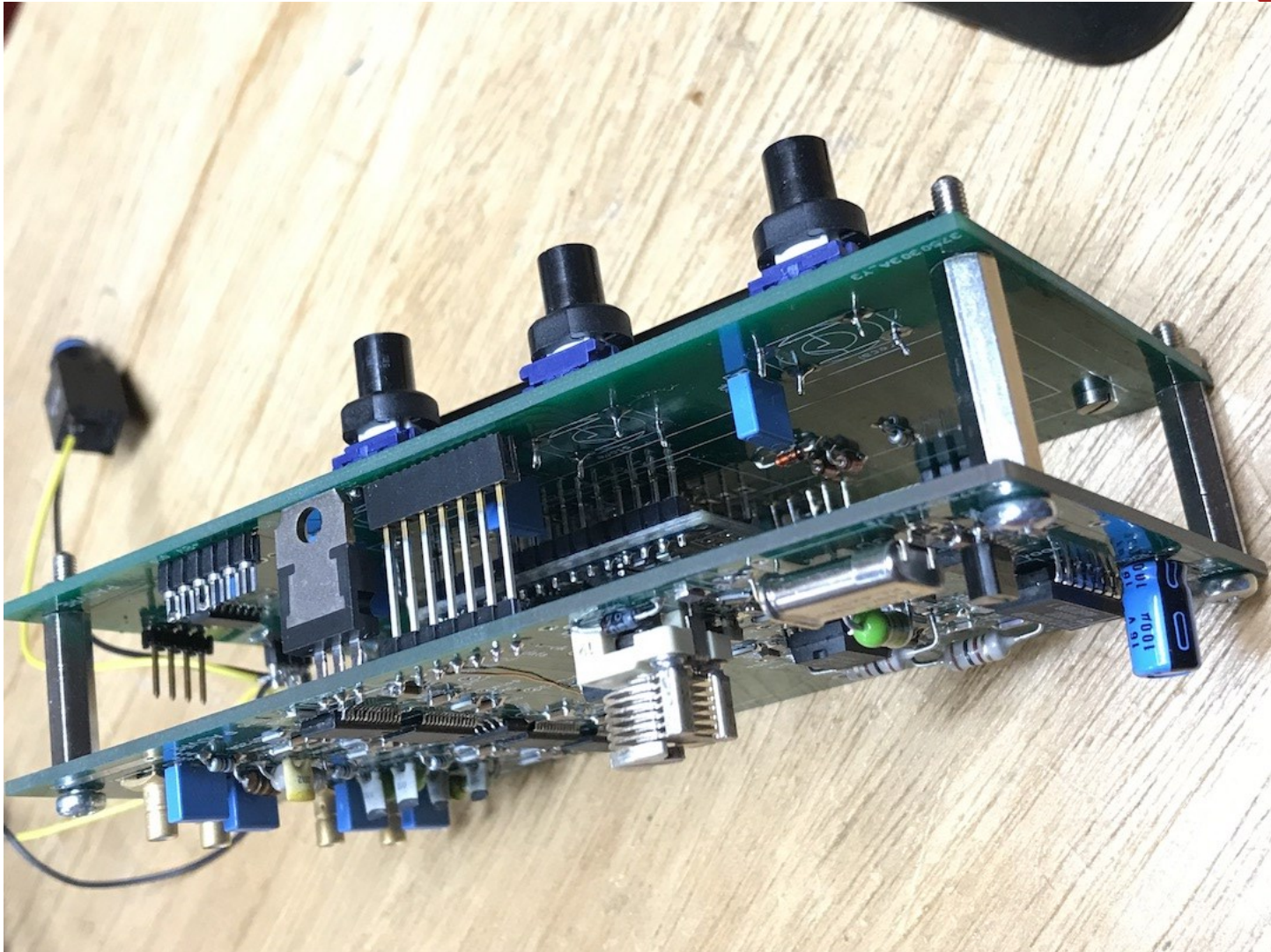
Comment: ref 70

Date: 17.MAY.2022 13:35:04

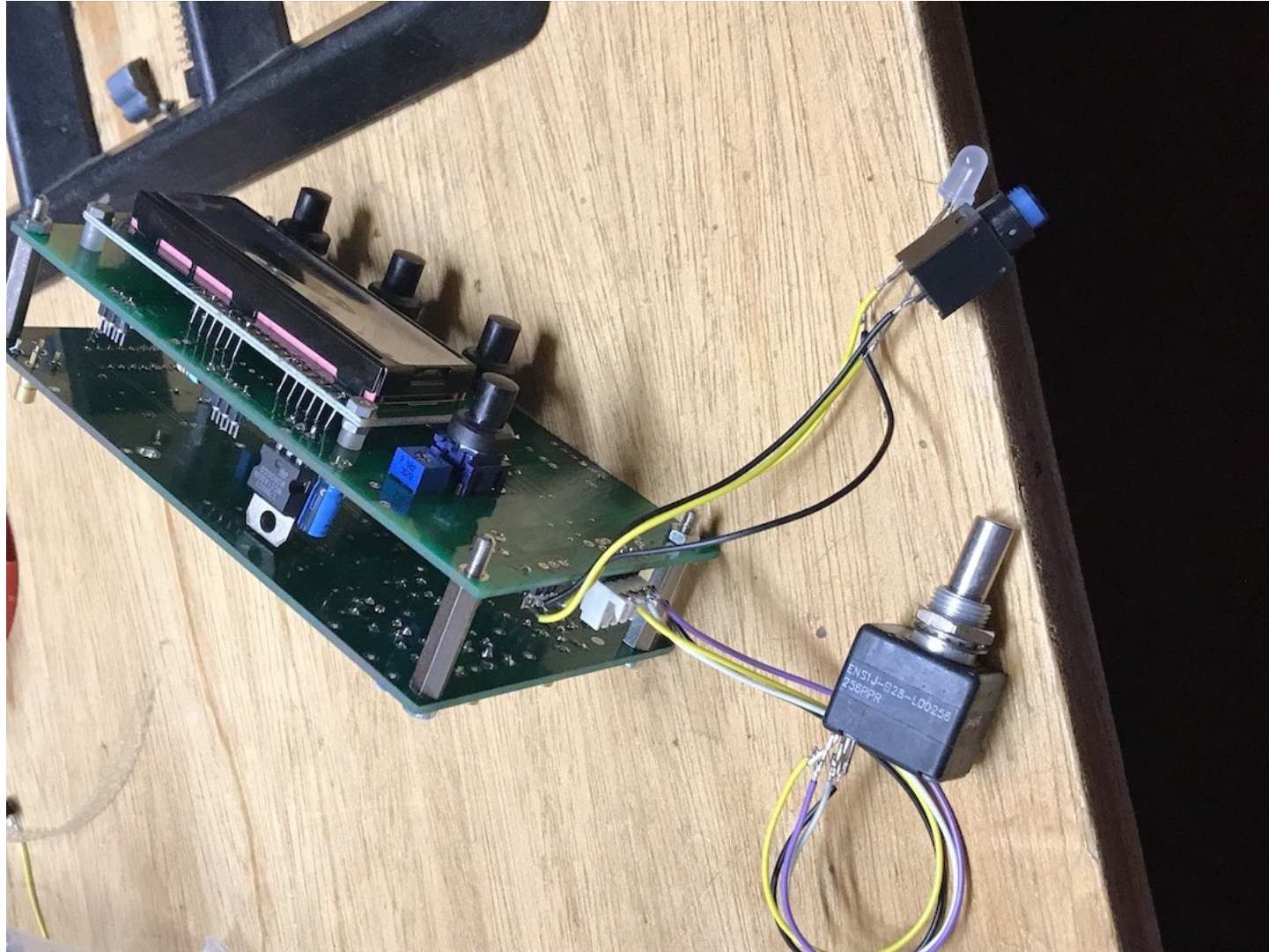
30MHz PLL & 4 maal DDS



DDS module met Arduino nano controller

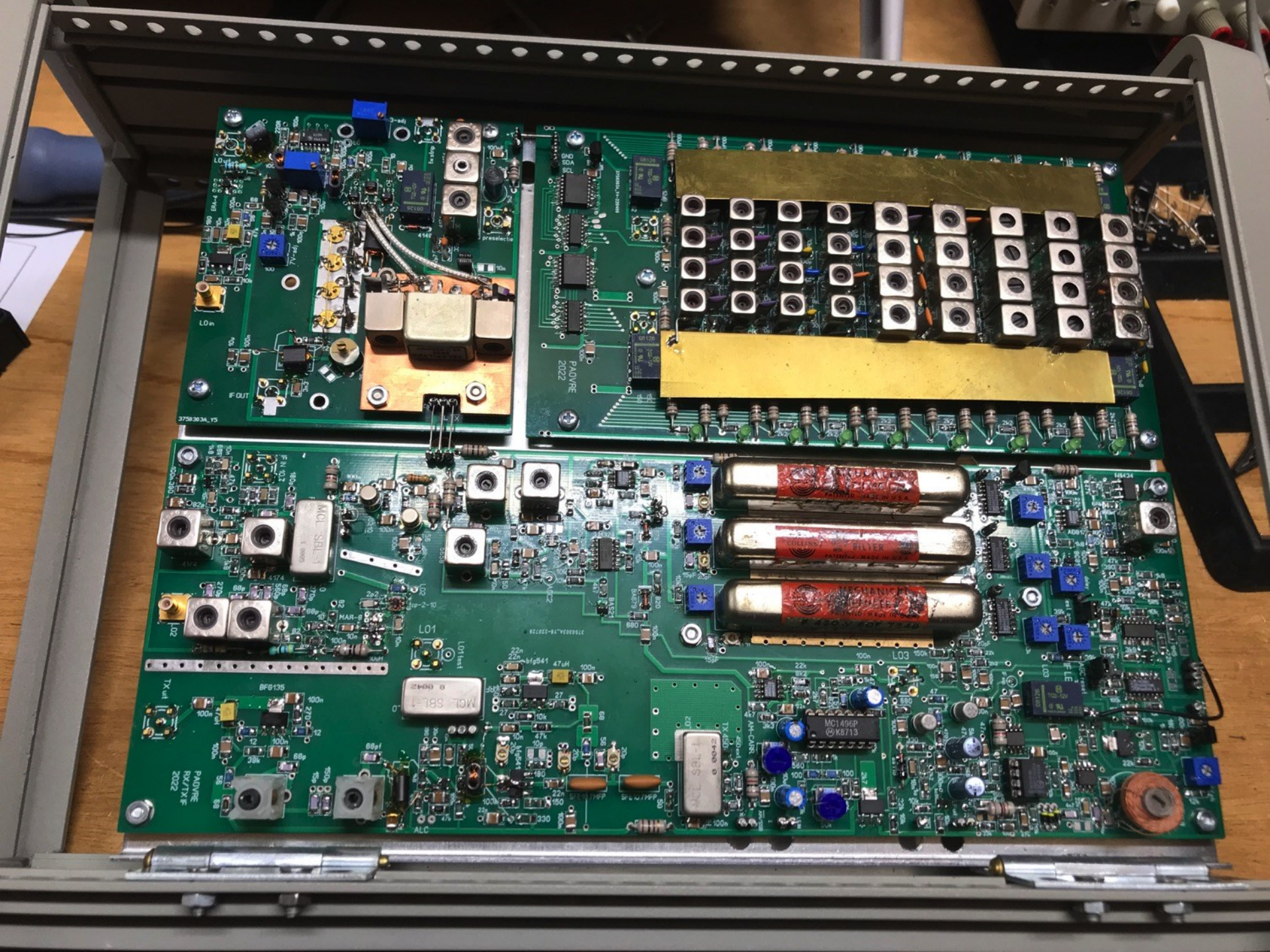


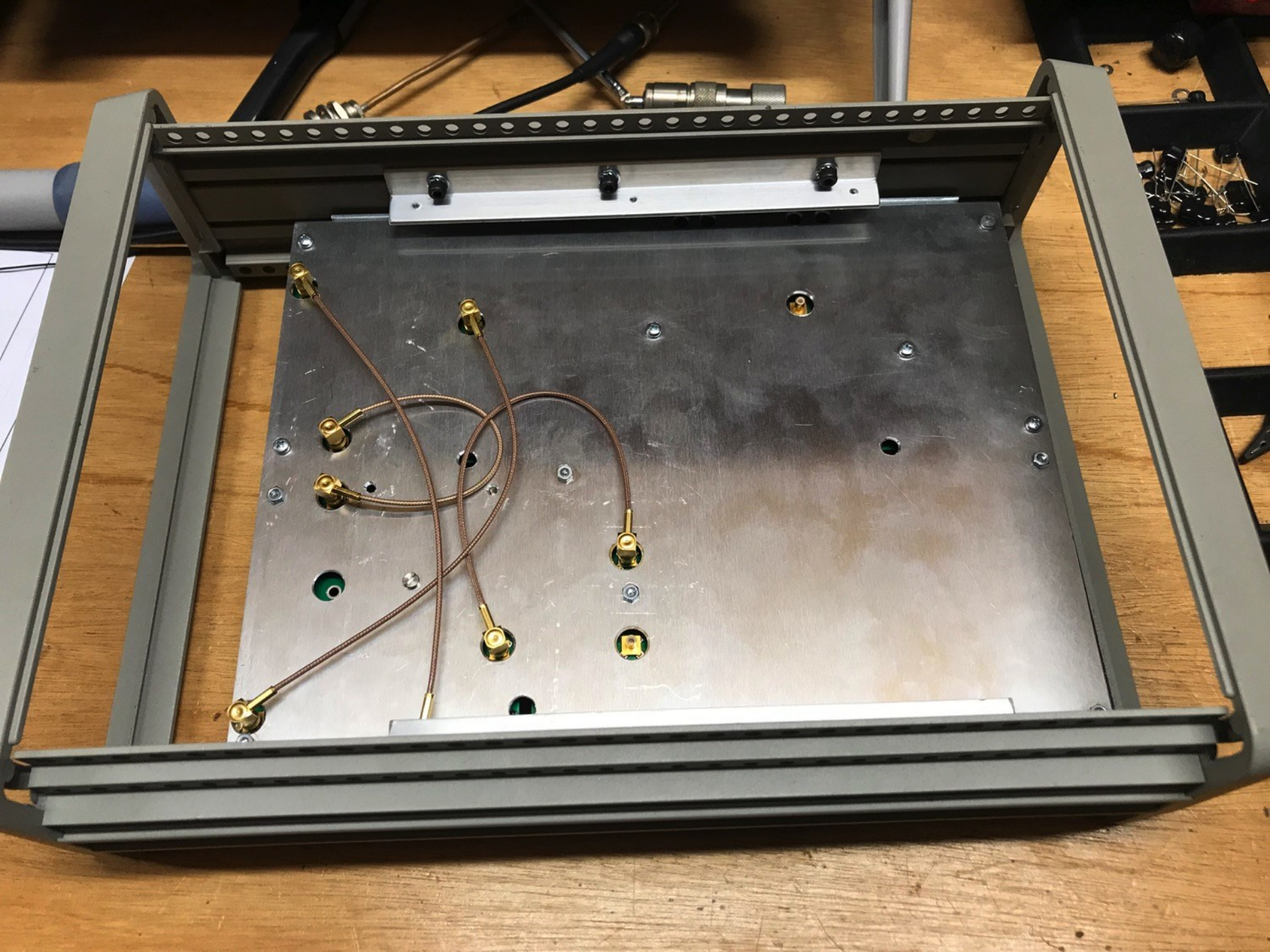
DDS module met Arduino nano controller



Geheel in wording

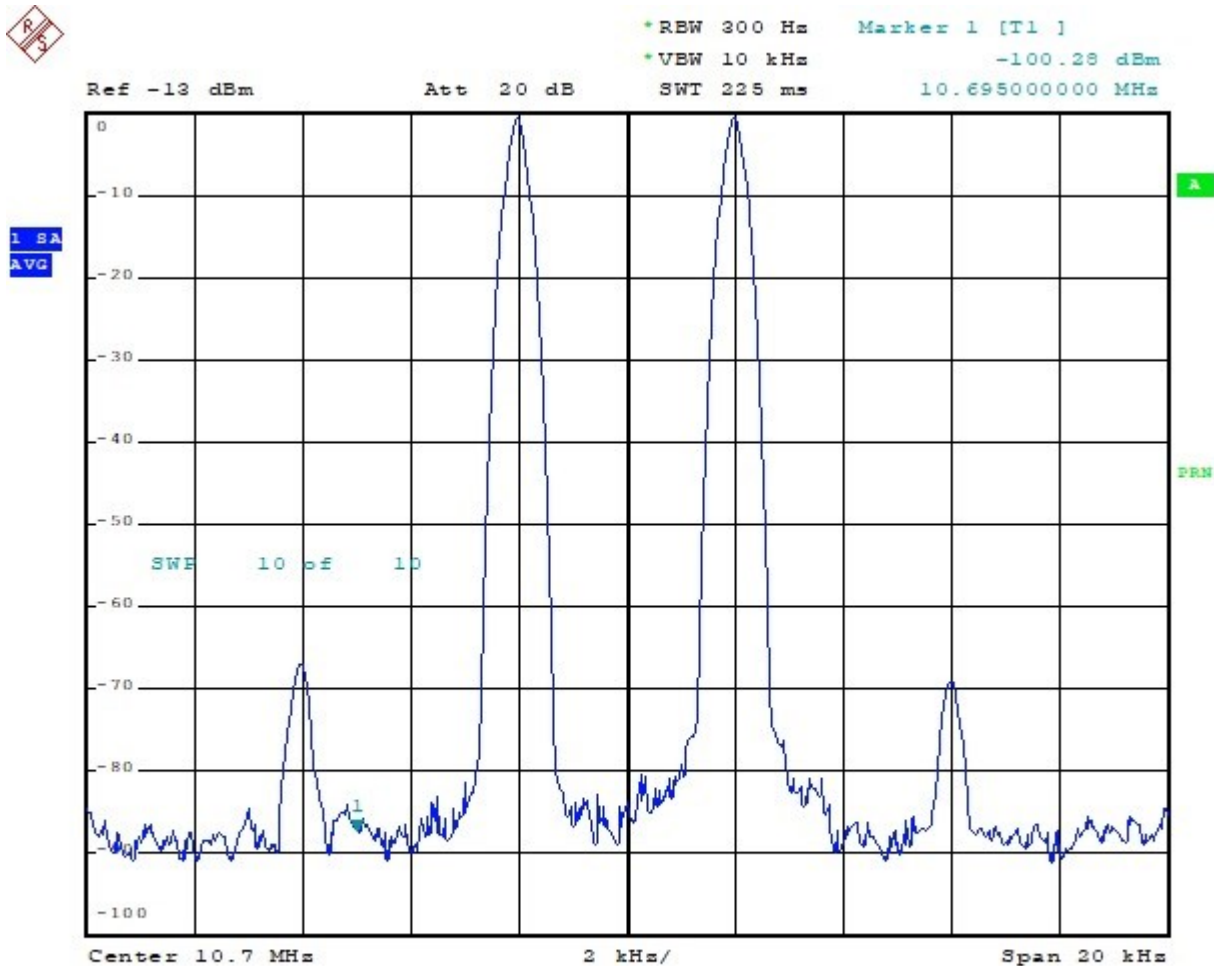






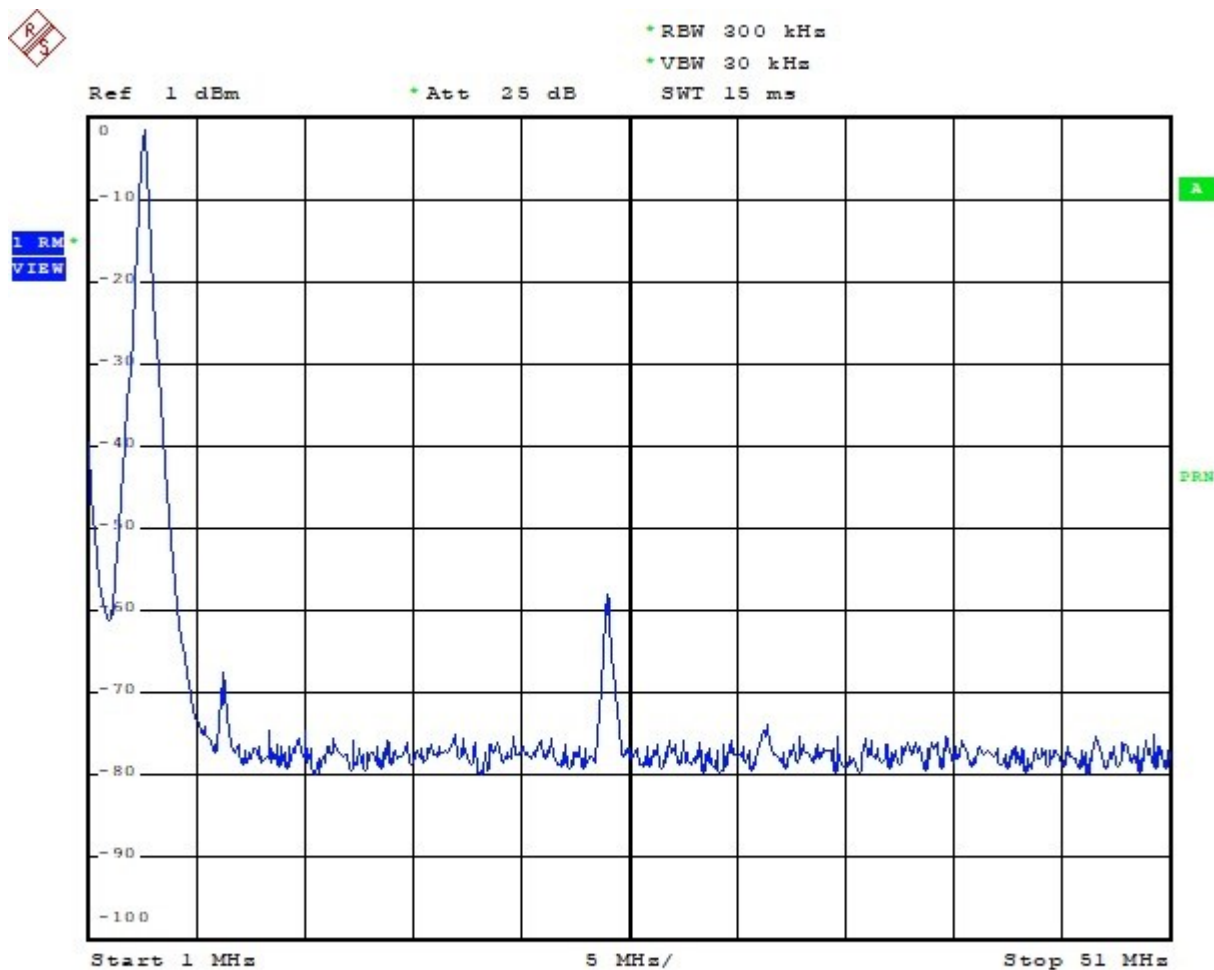
BF991 AGC versterker IMA₃

-19dBm is max. Signaal niveau in laatste IF trap, eerdere secties veel lager



Comment: ref 70
Date: 14.MAY.2022 16:20:30

Uitgangsspectrum 3,6MHz@ 0dBm niveau van MF trx print

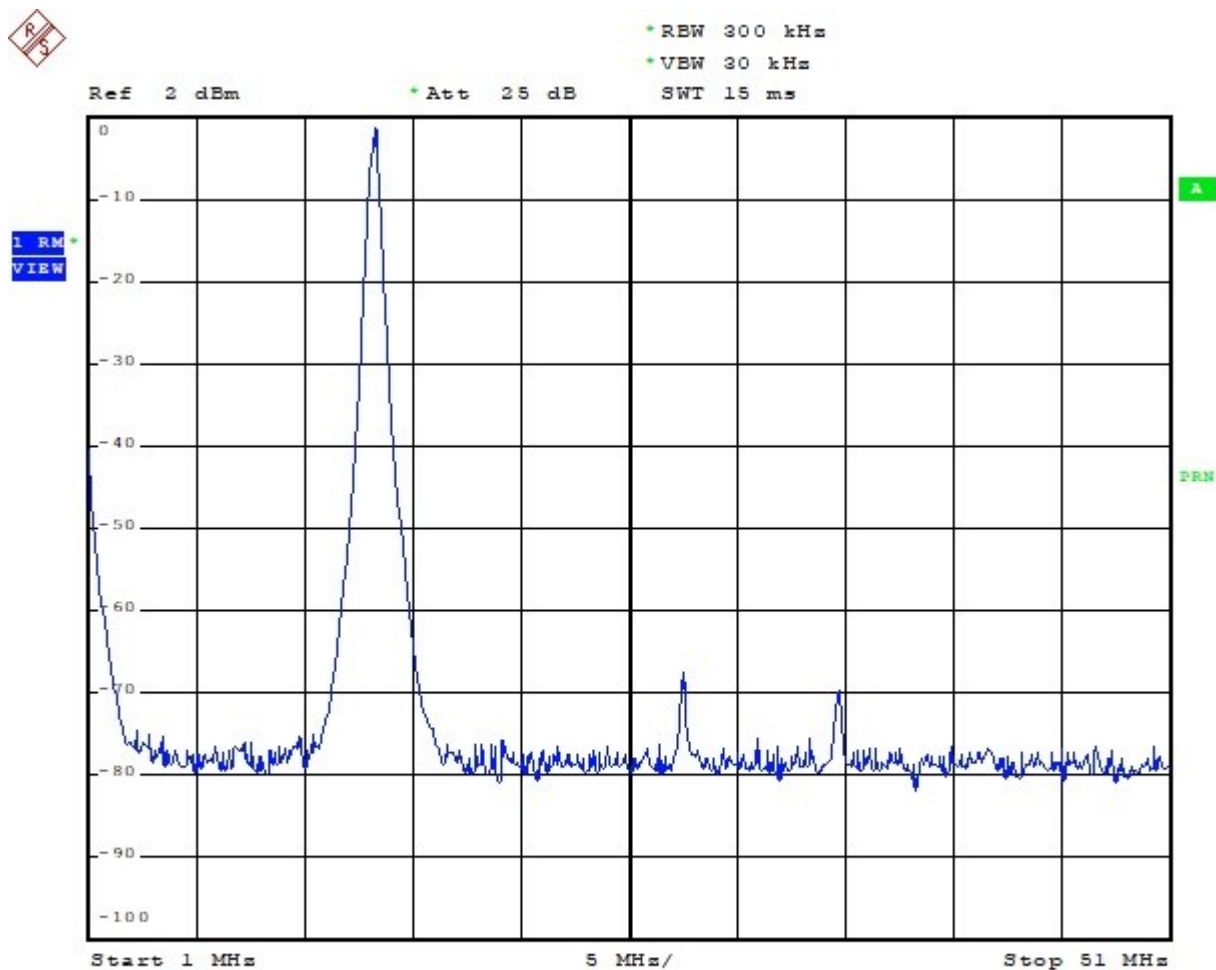


Comment: ref 70

Date: 3.OCT.2022 16:30:13



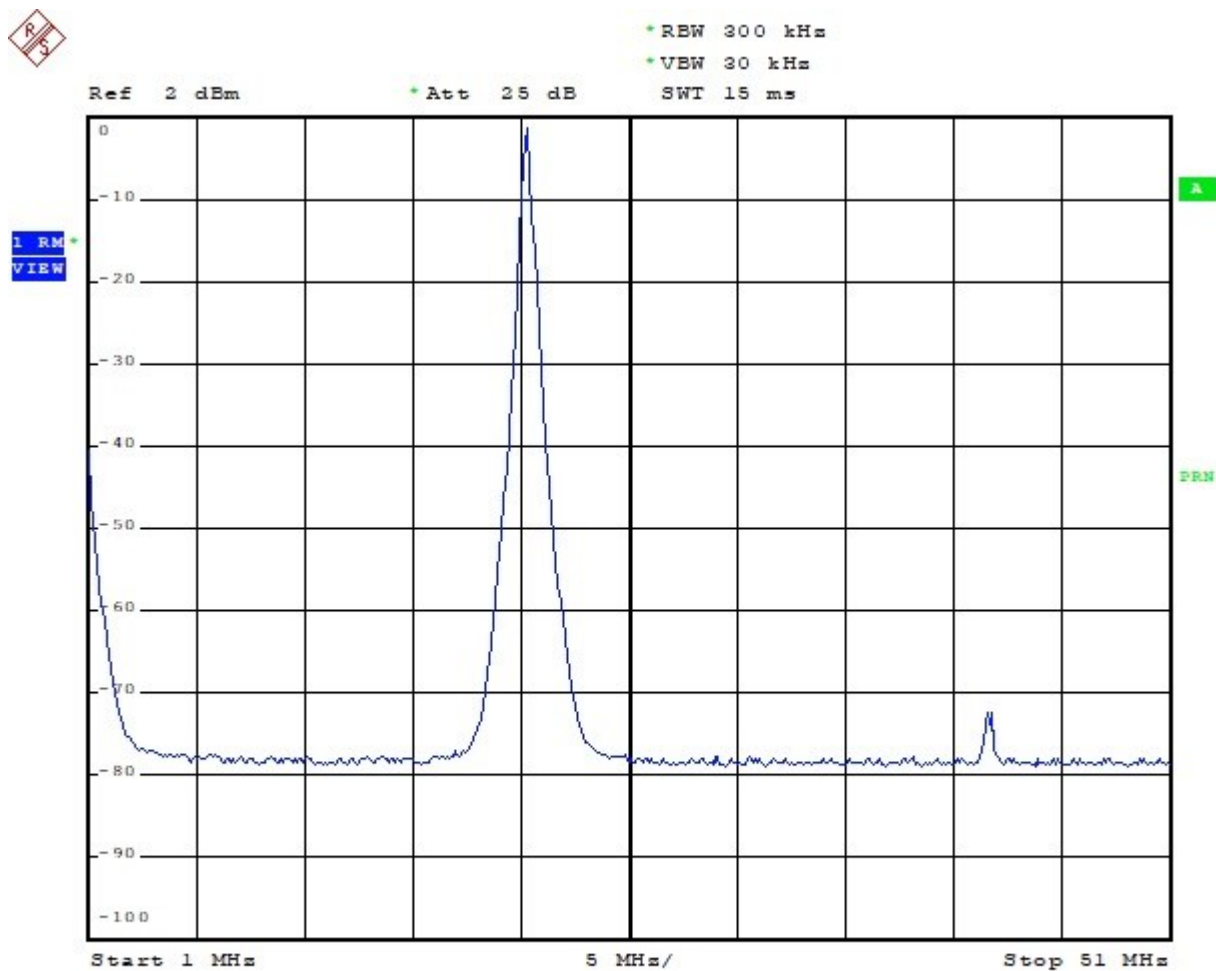
Uitgangsspectrum 14MHz@ 0dBm niveau van MF trx print



Comment: ref 70

Date: 3.OCT.2022 16:28:22

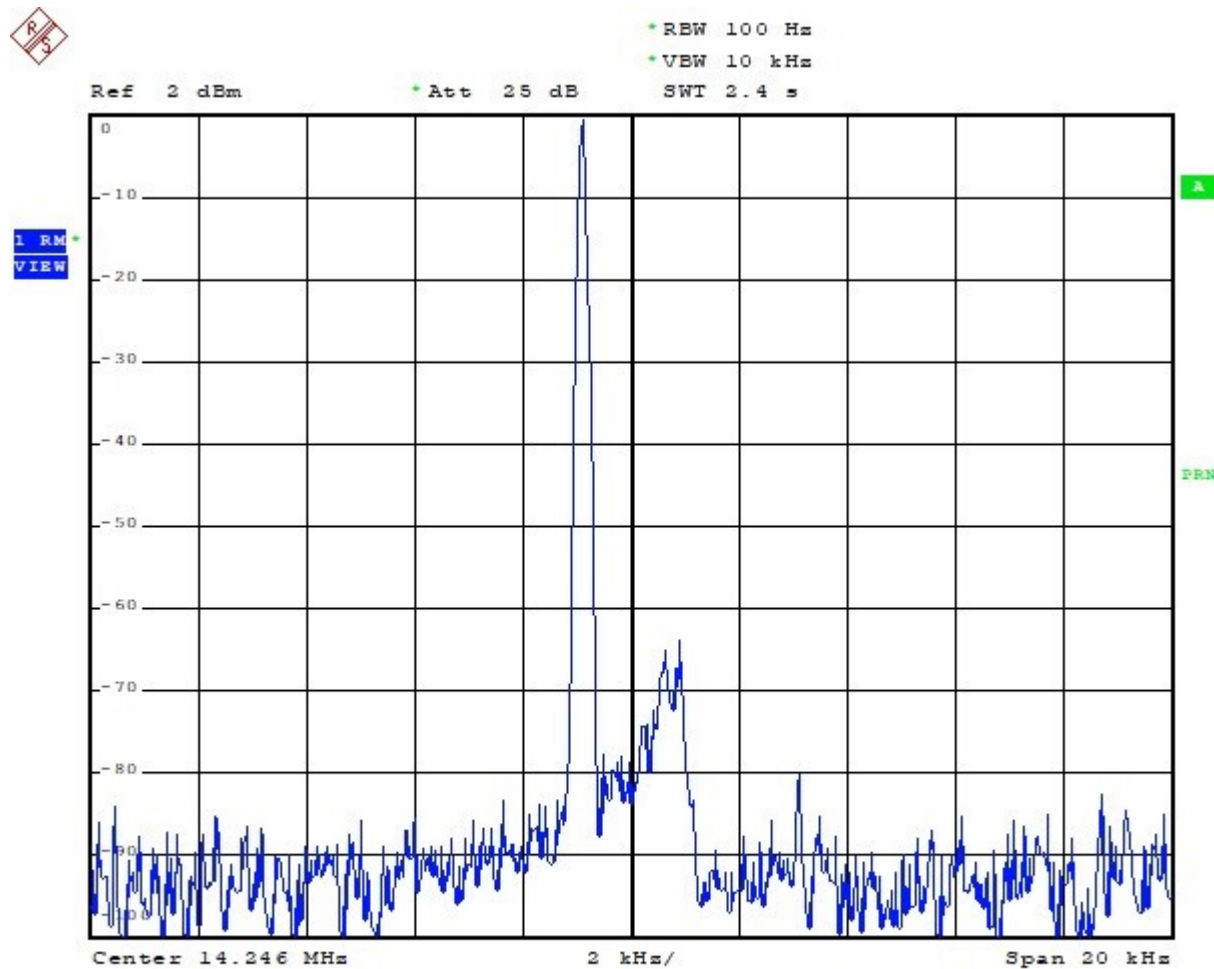
Uitgangsspectrum 21MHz@ 0dBm niveau van MF trx print



Comment: ref 70

Date: 2.OCT.2022 16:27:34

Uitgangsspectrum 14,2MHz @ 0dBm met 2000Hz modulatie



Comment: ref 70

Date: 3.OCT.2022 16:50:24