

DB6NT 10 GHz transverter Hits & kinks



Abstract

- 1- LO Pout improvement**
- 2- Gain / Nf measurement**
- 3- DB6NT V2 with external 106.5 MHz OCXO input**
- 4- I3OPW 106.5 MHz OCXO**
- 5- DB6NT V3 with external 10 MHz OCXO input**
- 6- Final linear gain, Nf and output power measures**

1- LO modification (all models)

Overview

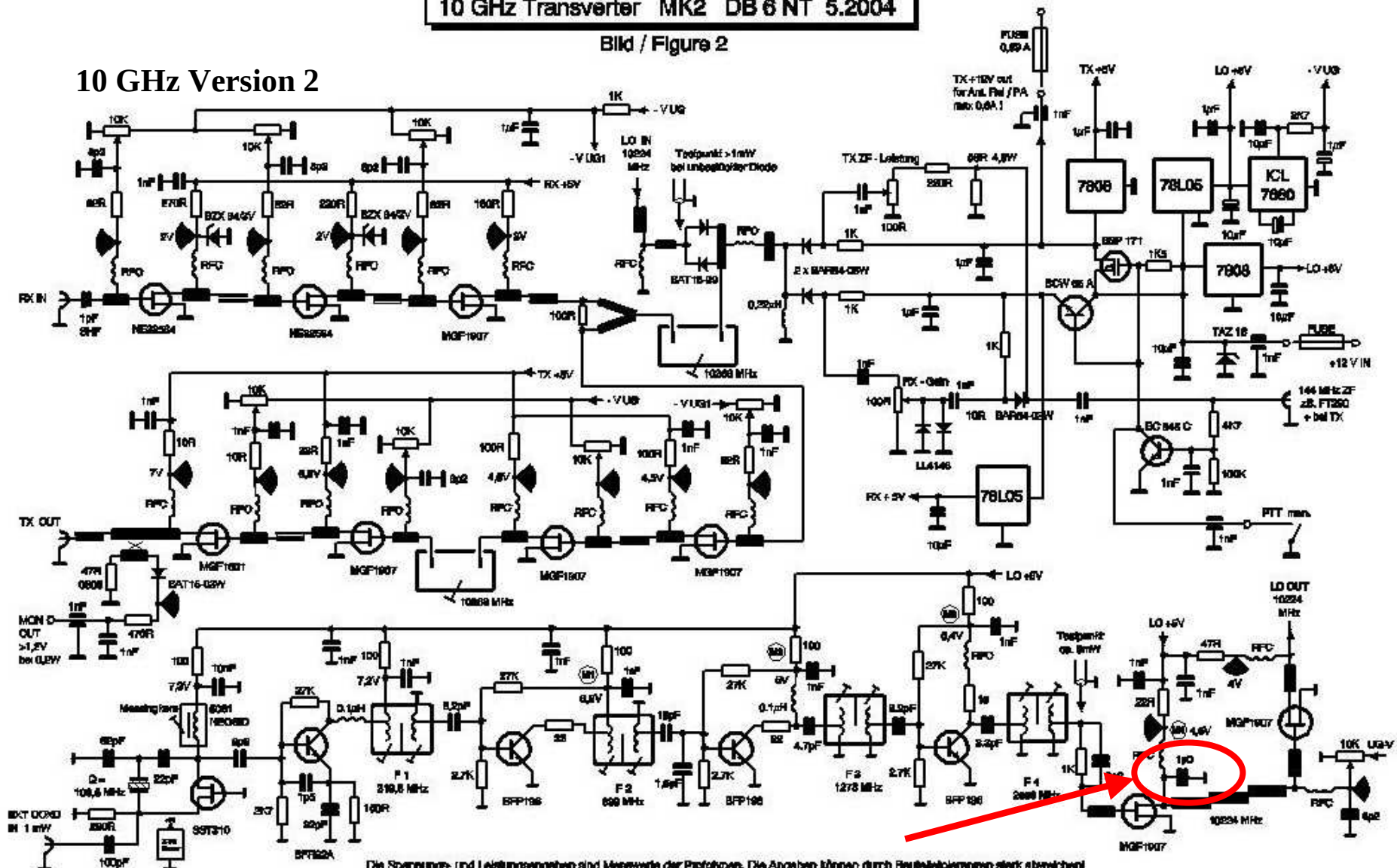
- Many DB6NT 10 GHz transverters have their 10 GHz output power restricted to about +20 to +21 dBm instead of a minimum of +23 dBm or 250 mW.
- Dixit Christof ON4IY when looking to the LO chain, the 10 GHz quadrupler FET MGF 1907 before the interdigital filter has the 1 pF decoupling chip capacitor between drain and ground often missing !!!
- A single 1 pF 0402 chip capacitor must **increase the LO total output** and also solve the transverter output power lack. So, **more as +24 dBm** or 250 mW seems normally easy to obtain !!
- Have a look in yours !!
- Not yet done here but more when I'll do the same on mine !!

DB6NT transverter LO modification

10 GHz Transverter MK2 DB 6 NT 5.2004

Bild / Figure 2

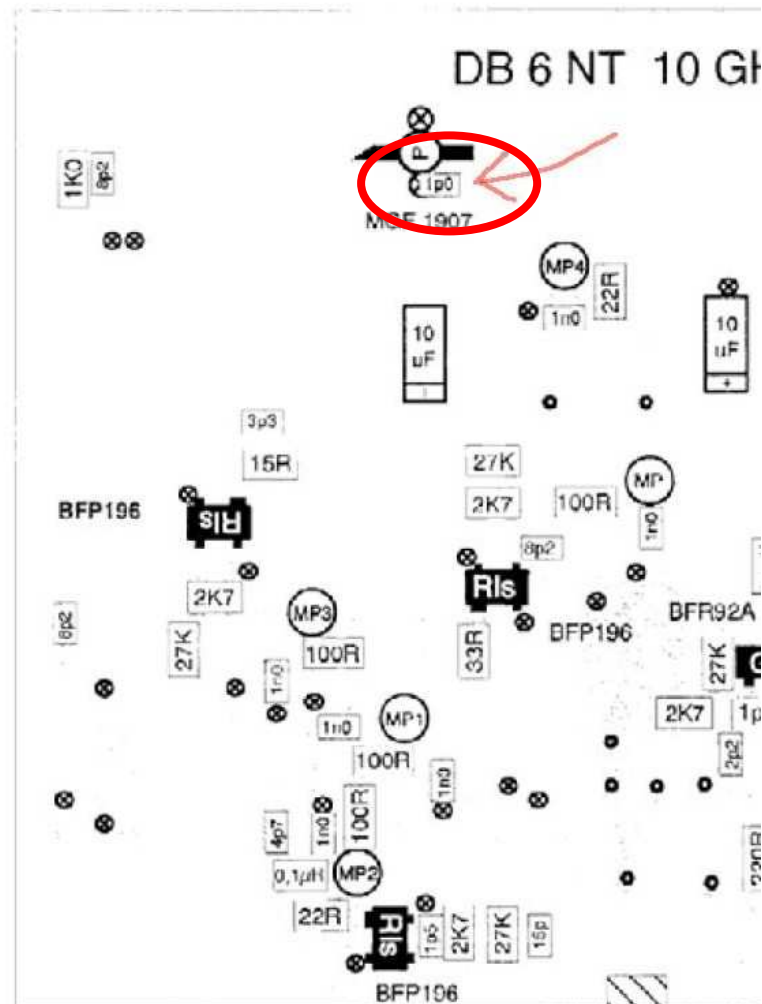
10 GHz Version 2



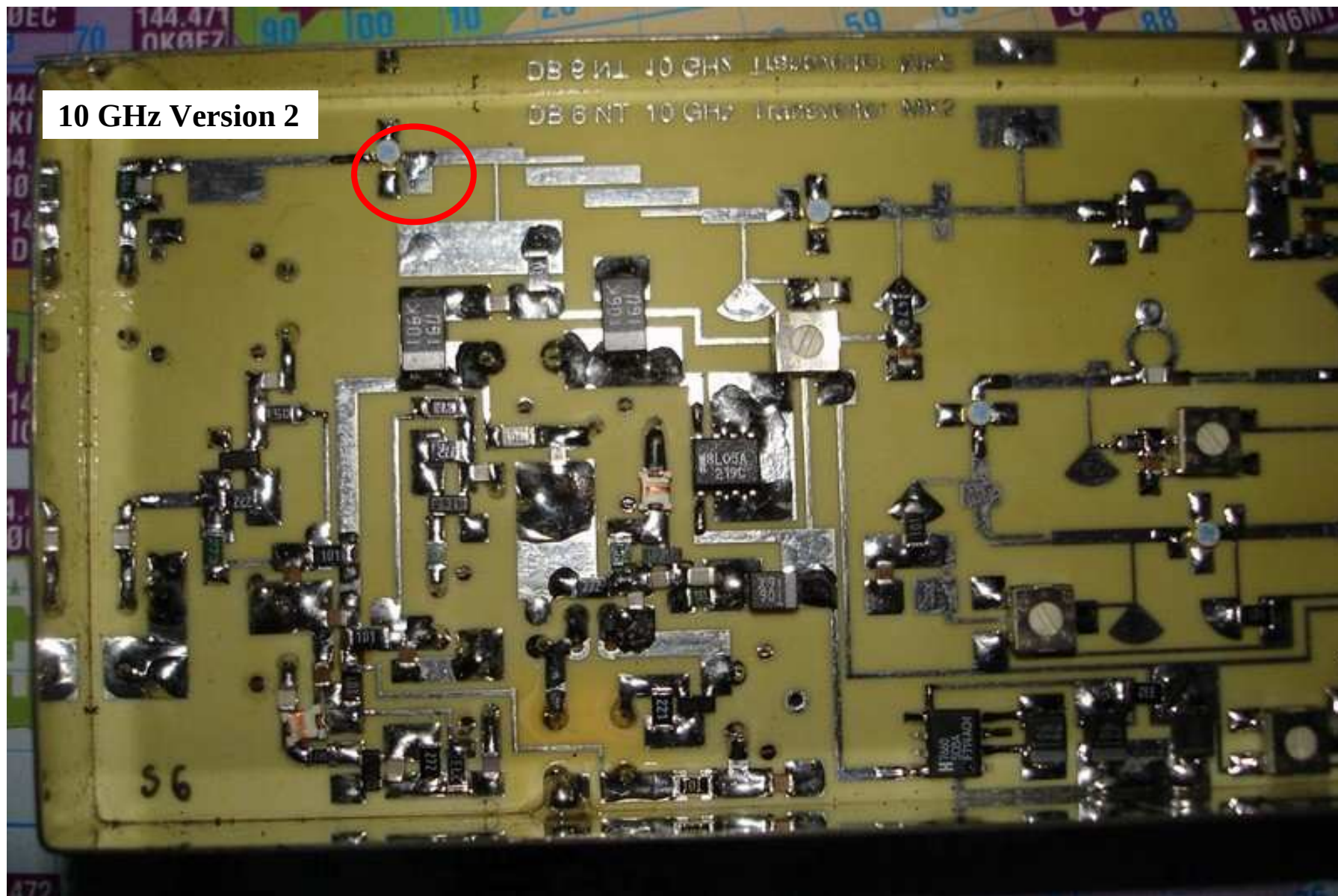
Die Spannungs- und Leistungsangaben sind Messwerte der Prototypen. Die Angaben können durch Bauteiltoleranzen stark abweichen!
The voltage and power data are measured values of the prototypes. The data can differ widely due to component tolerances.

DB6NT transverter LO modification

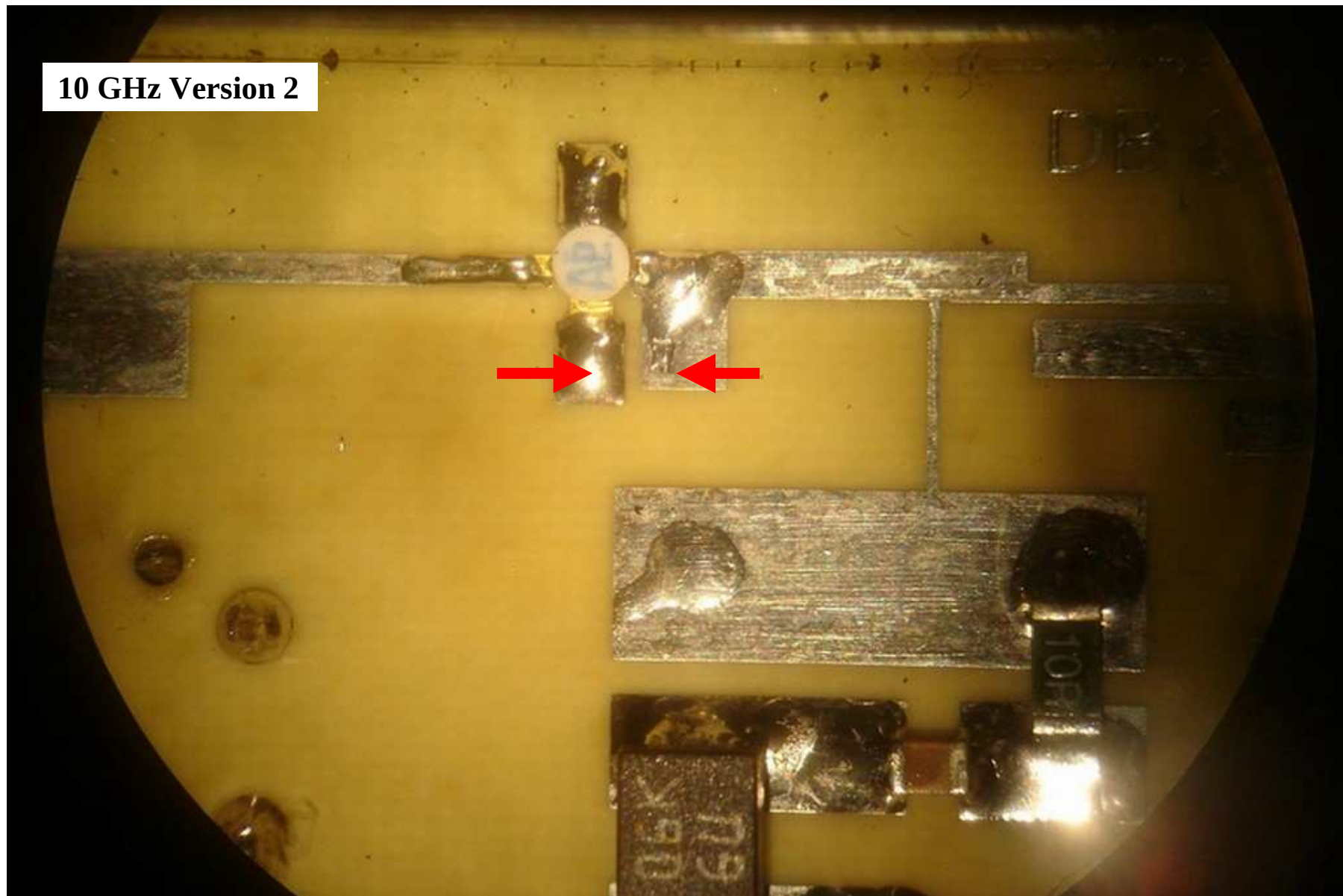
10 C



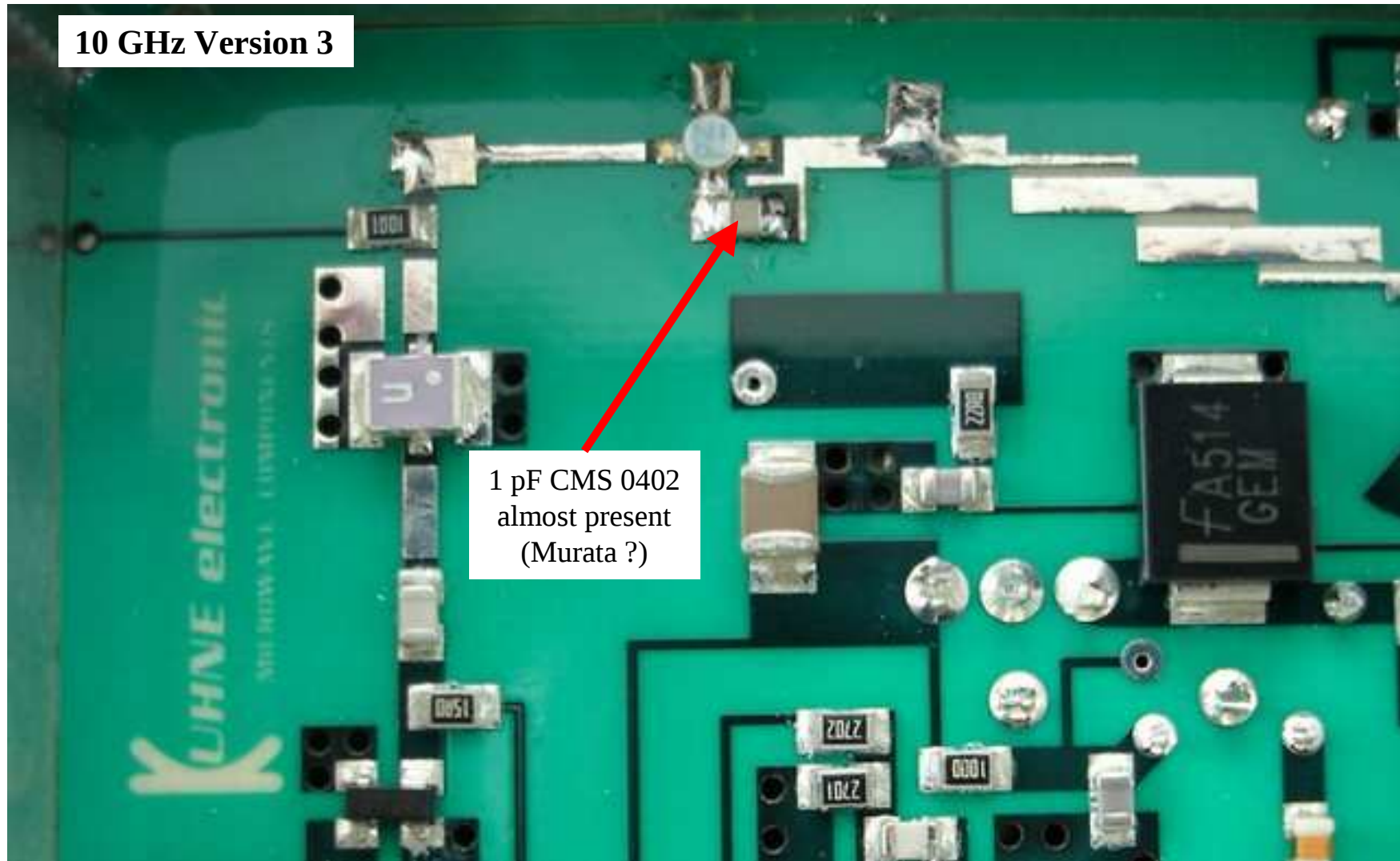
DB6NT transverter LO modification



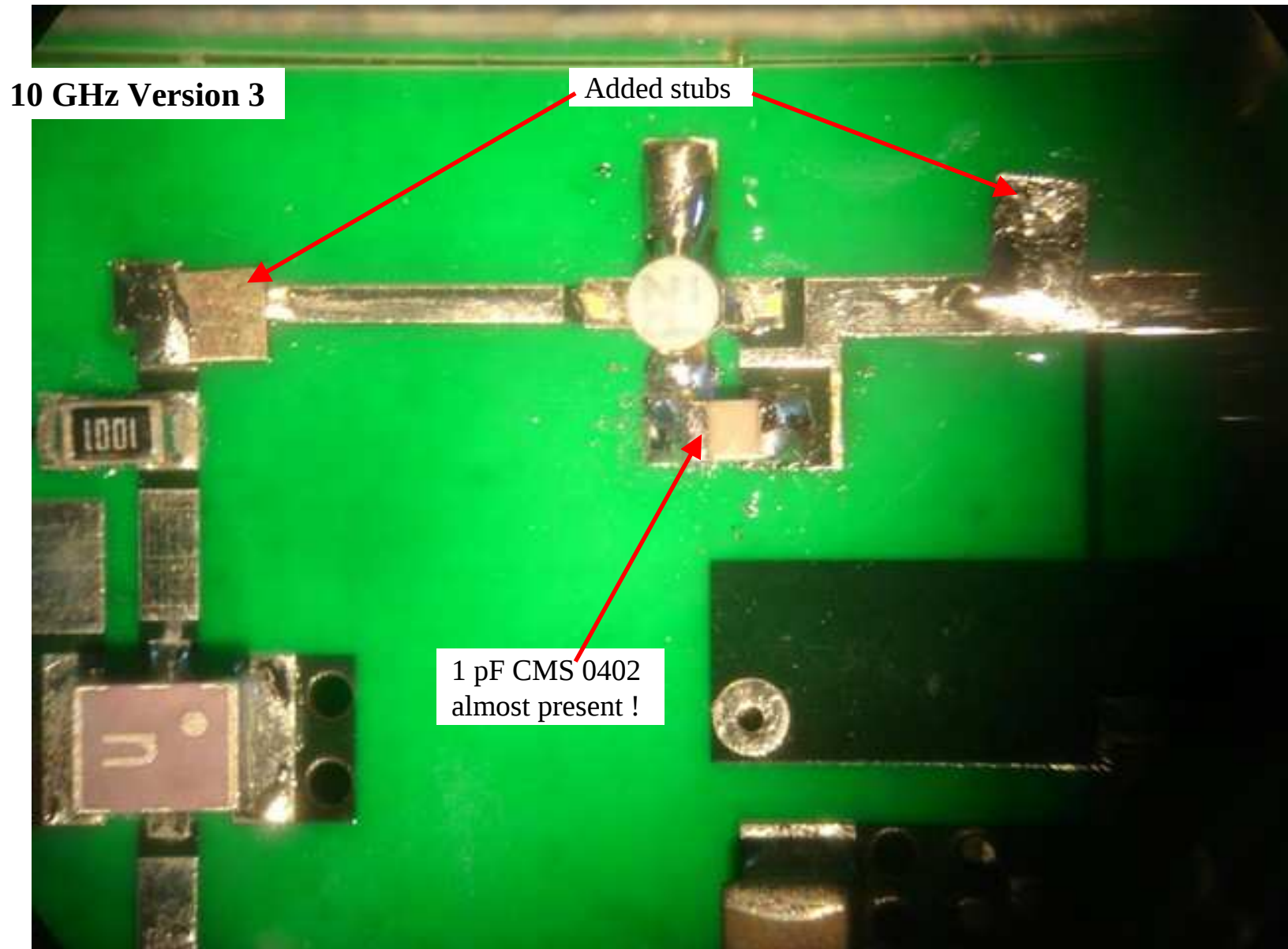
DB6NT transverter LO modification



DB6NT transverter LO modification



DB6NT transverter LO modification



2- Gain & Nf measurements

Done with:

- HP 8970a noise / gain analyser
- Ailtech 7616 noise source with 15 dB ENR table cal given up to 12.4 GHz

The DSB measurement (SP 1.0 without ext LO) with directly calibration between 144 and 148 MHz gives:

- directly the exact conversion gain
- a good idea of the Nf à ± 0.3 dB

10 GHz DB6NT gain / Nf meas à 144 MHz

V2 model with internal 106.5 MHz Qz



10 GHz DB6NT gain / Nf meas à 144 MHz

V2 model with external 106.5 MHz OCXO



10 GHz DB6NT gain / Nf meas à 144 MHz

V3 model with internal 106.5 MHz quartz



5.7 GHz DB6NT gain / Nf meas à 144 MHz

As measuring example

V2 with internal Quarz



3- DB6NT V2 transverter with external 106.5 MHz OCXO input

- Frequency error à 10 GHz after 10 minutes warm-up time with outside 106.5 MHz OCXO < 2.5 kHz at room temperature (depending on OCXO stability)
- Frequency drift after 24 hours < 2.5 kHz

DB6NT V2 with external 106.5 MHz OCXO input

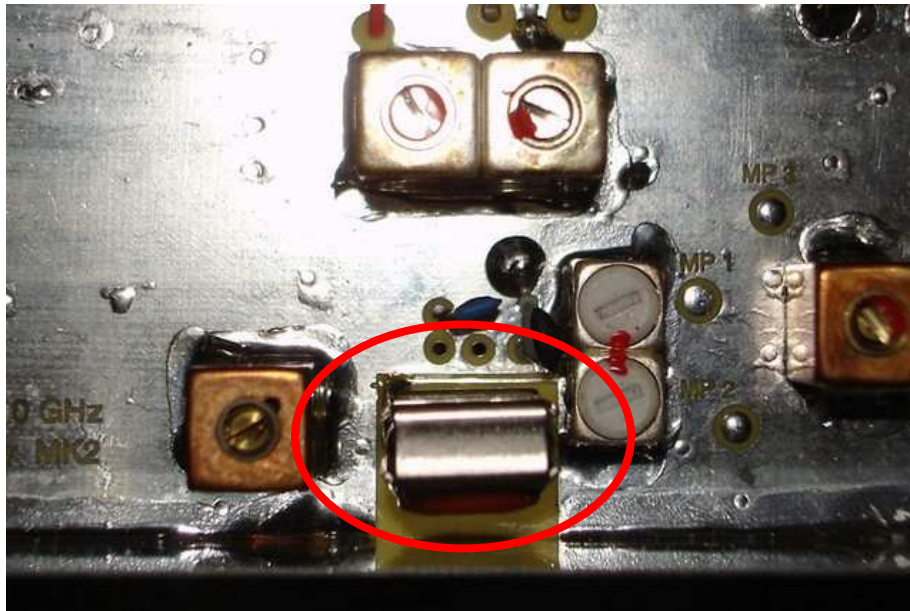
V2 model needs external 106.5 MHz OCXO
(no quartz inside)



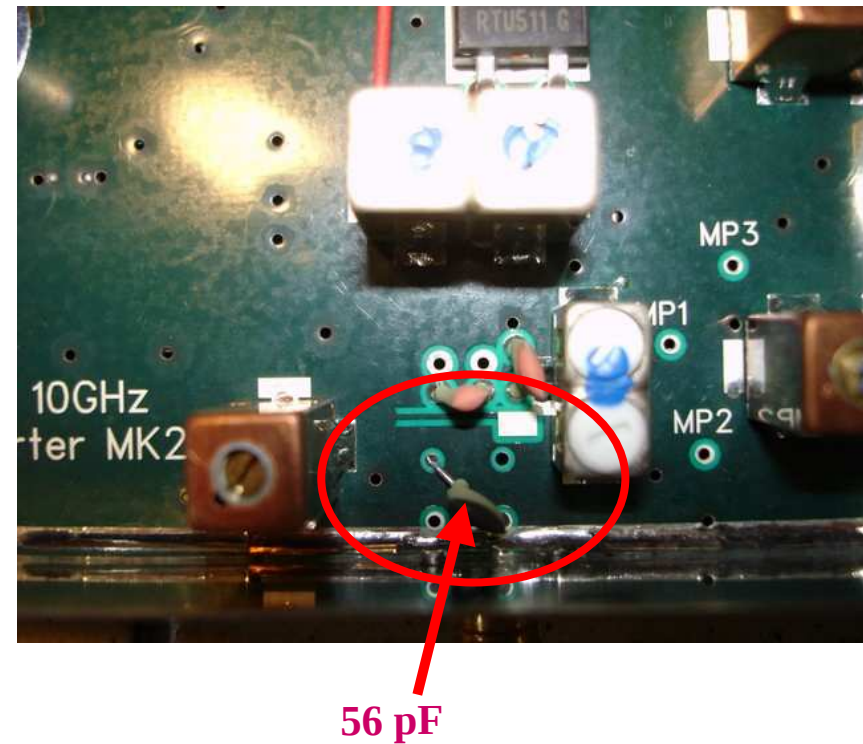
DB6NT V2 with external 106.5 MHz OCXO input

Printboard rear view

Internal 106.5 MHz Qz with CTP



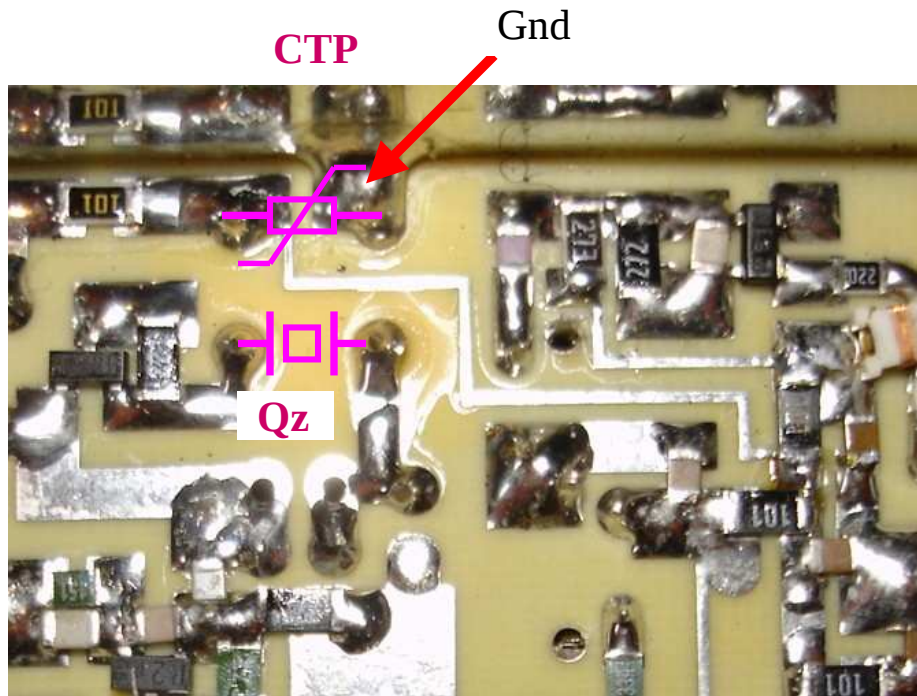
External OCXO mod



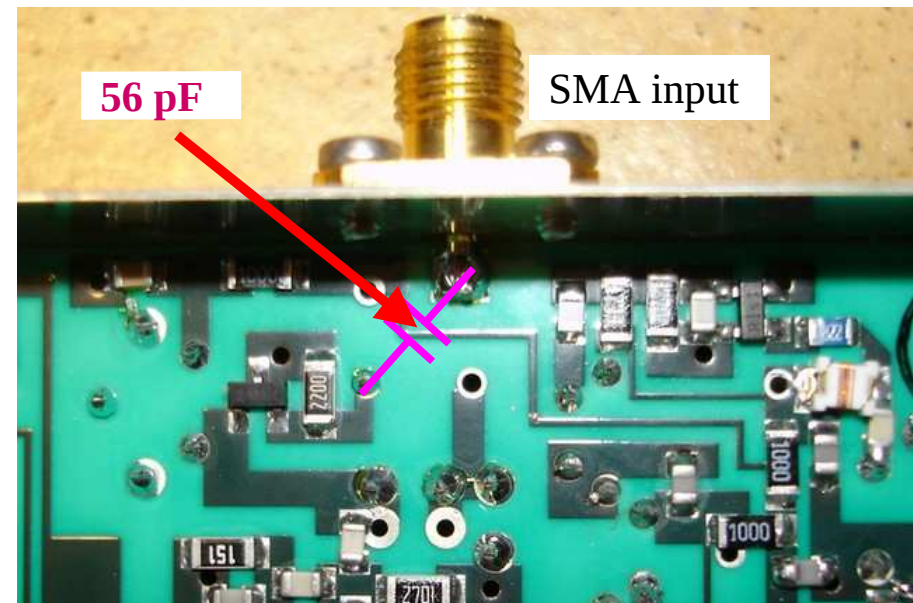
DB6NT V2 with external 106.5 MHz OCXO input

Printboard front view

Internal 106.5 MHz Qz



External OCXO mod



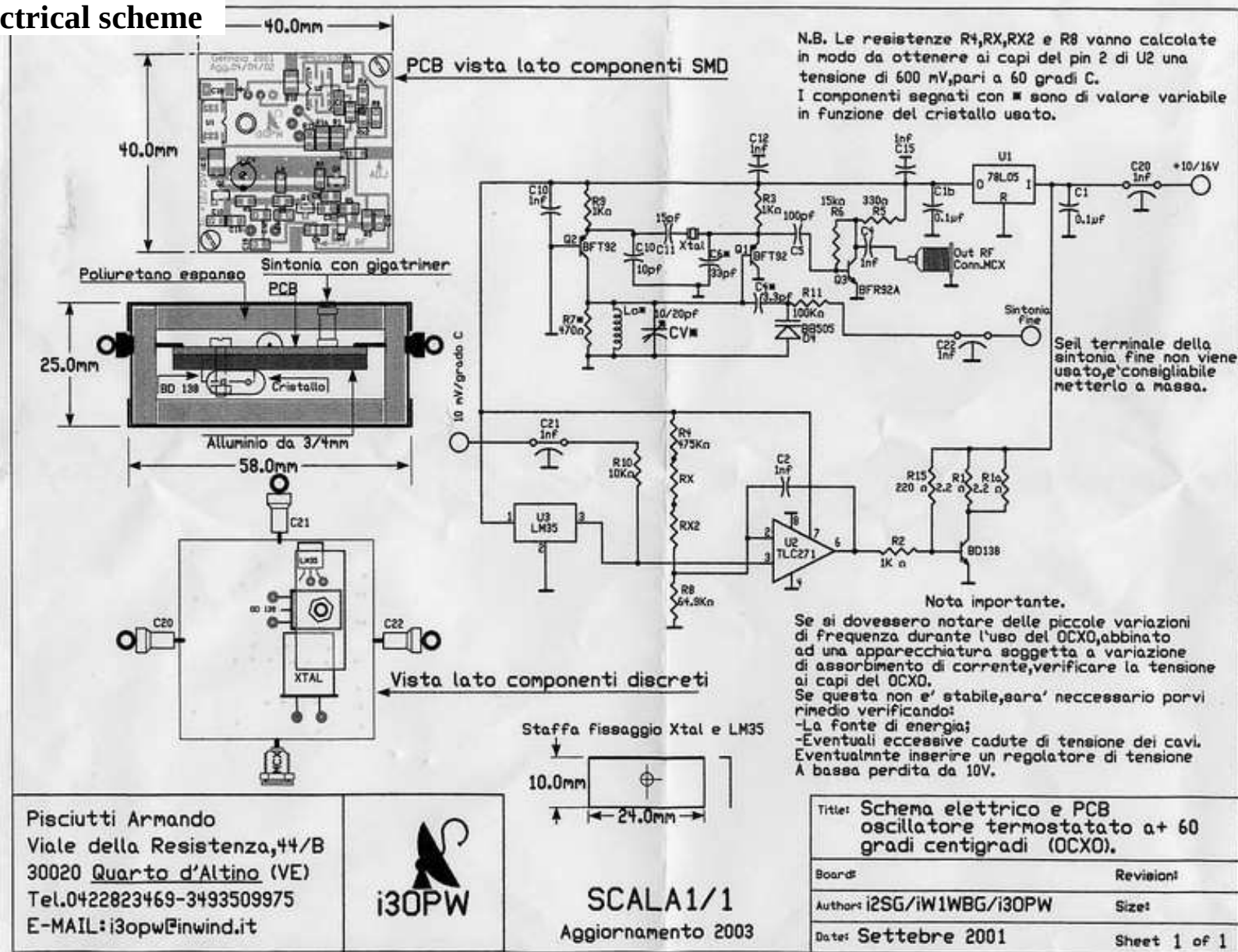
4- I3OPW 106.5 MHz OCXO

**Intended for V2 model with external 106.5 MHz OCXO input
Pout = +4 dBm**

Ready to use price 100€

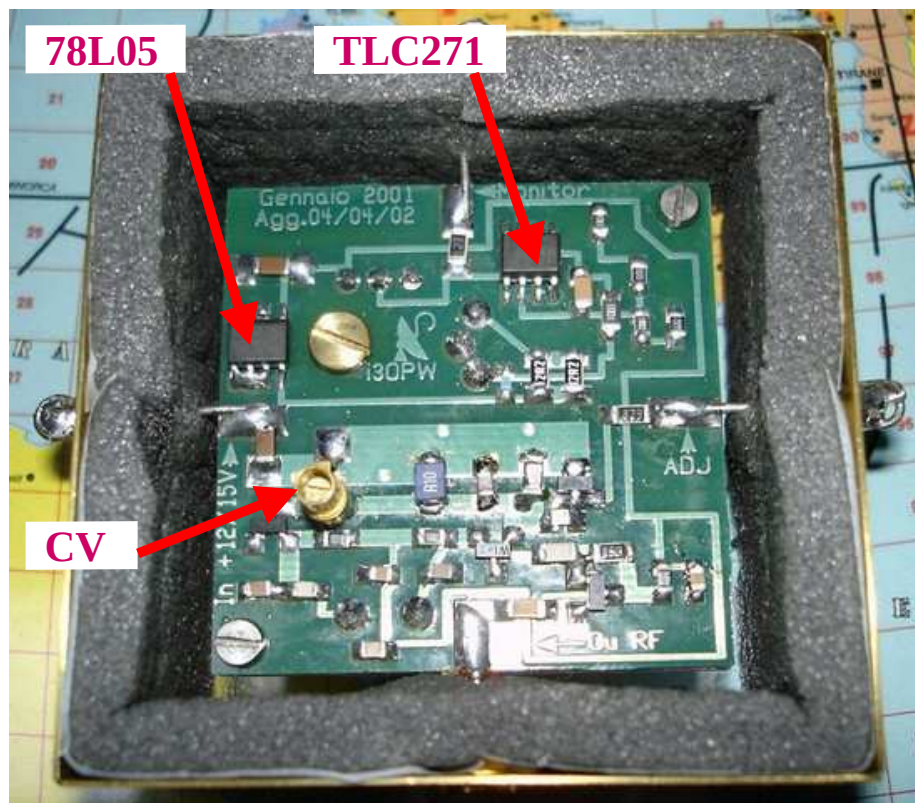
I3OPW 106.5 MHz OCXO

Electrical scheme

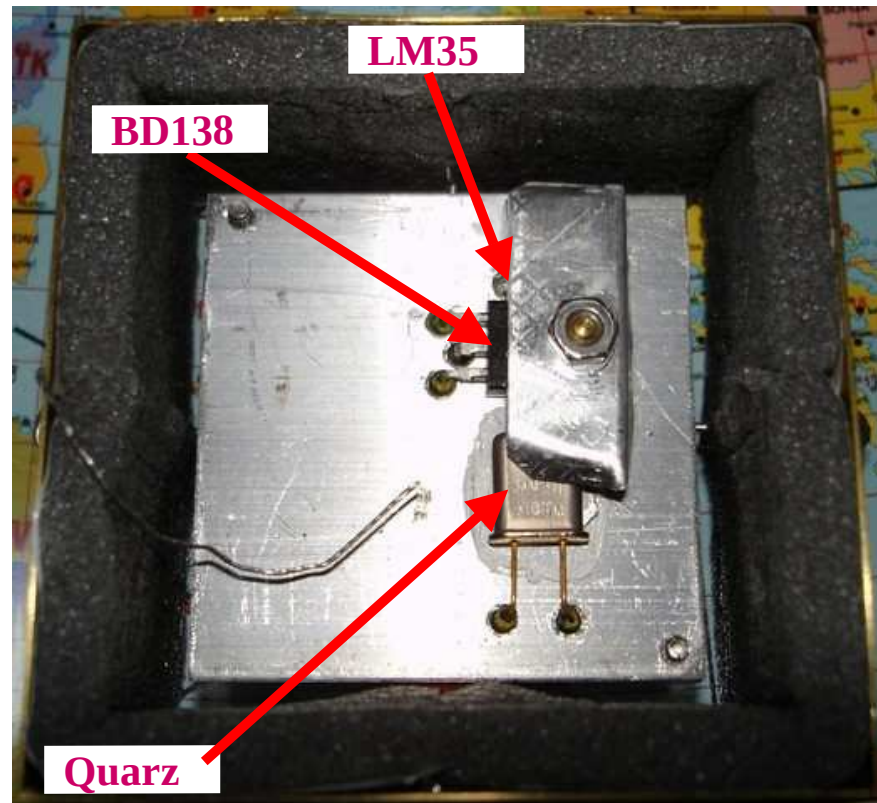


I3OPW 106.5 MHz OCXO

Printboard view

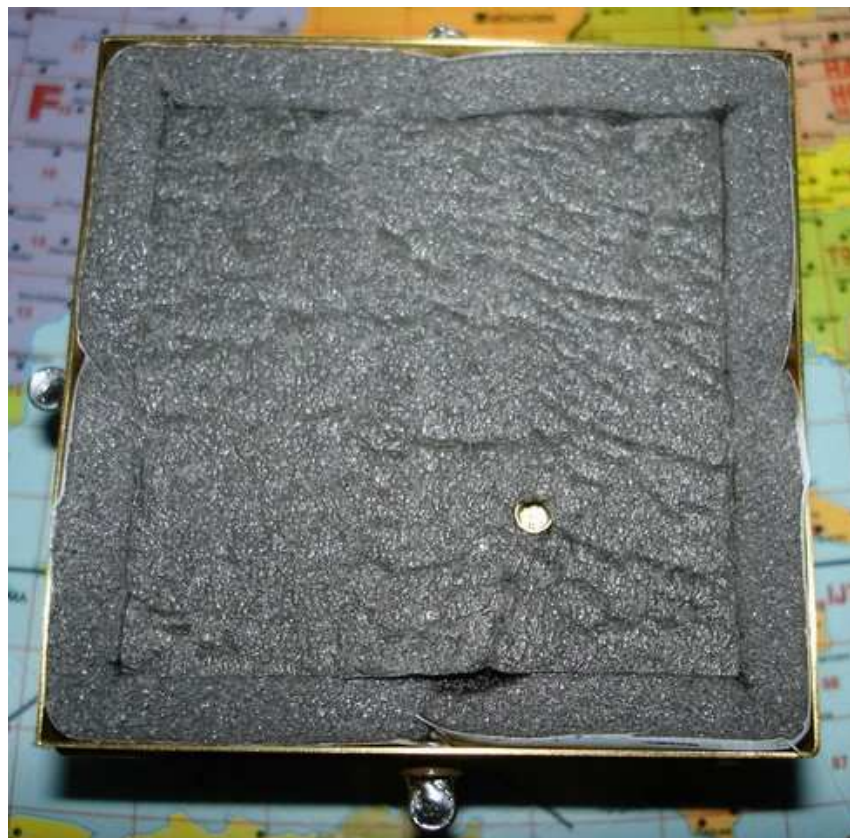


Rear view



I3OPW 106.5 MHz OCXO

Top view



Covered box



5- DB6NT V3 transverter with external 10 MHz OCXO input

- Frequency error à 10 GHz in self running mode after 10 minutes warm-up time at room temperature = +9 to +12 kHz
- Frequency error when locked to an outside 10 MHz, +2 dBm min OCXO reference <300 Hz
- Frequency drift after 24 hours < 200 Hz

DB6NT V3 with external 10 MHz OCXO input

For best frequency stability, V3 model only needs external 10 MHz OCXO (106.5 MHz quartz inside)



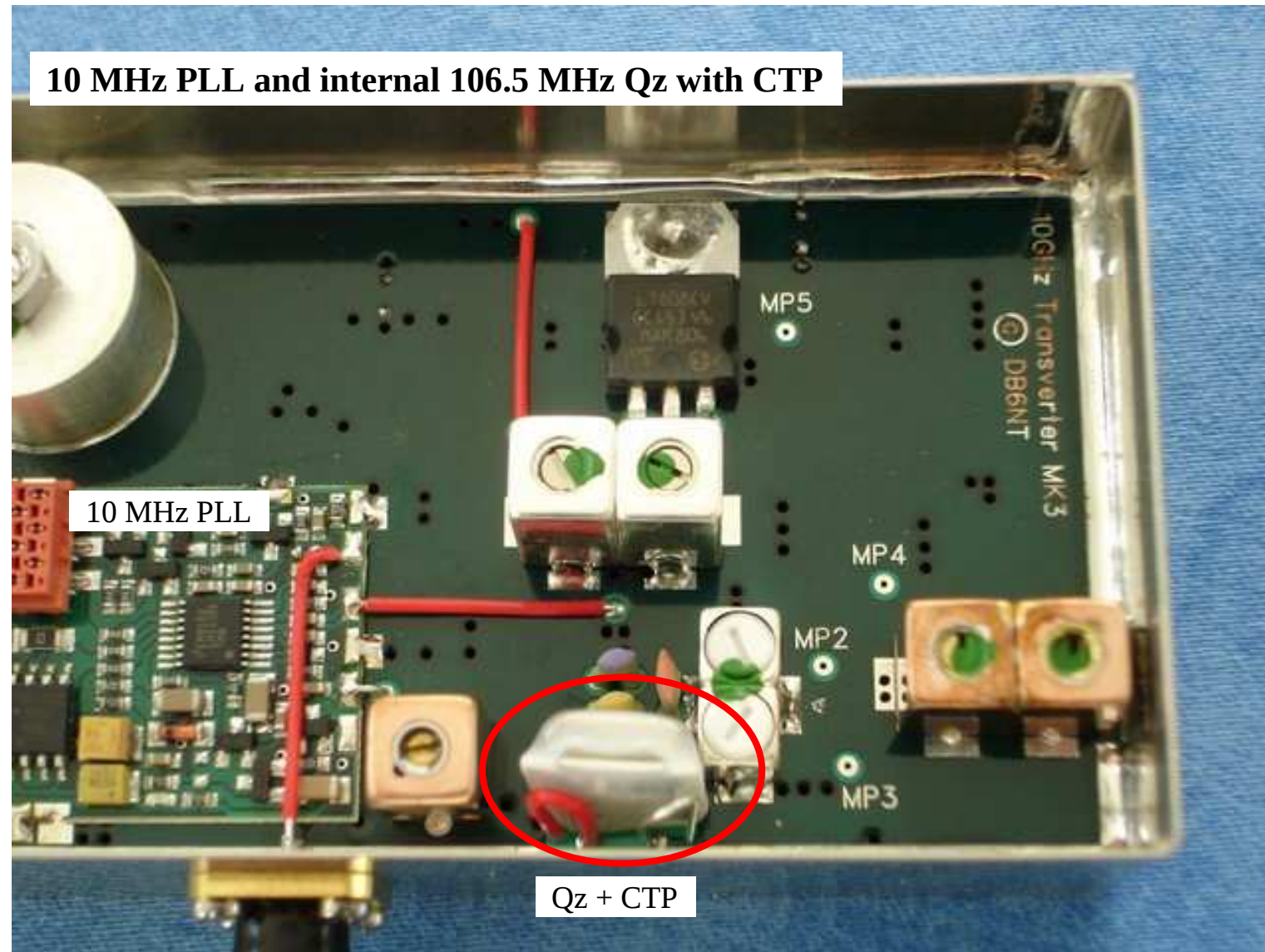
DB6NT V3 with external 10 MHz OCXO input

Printboard front view



DB6NT V3 with external 10 MHz OCXO input

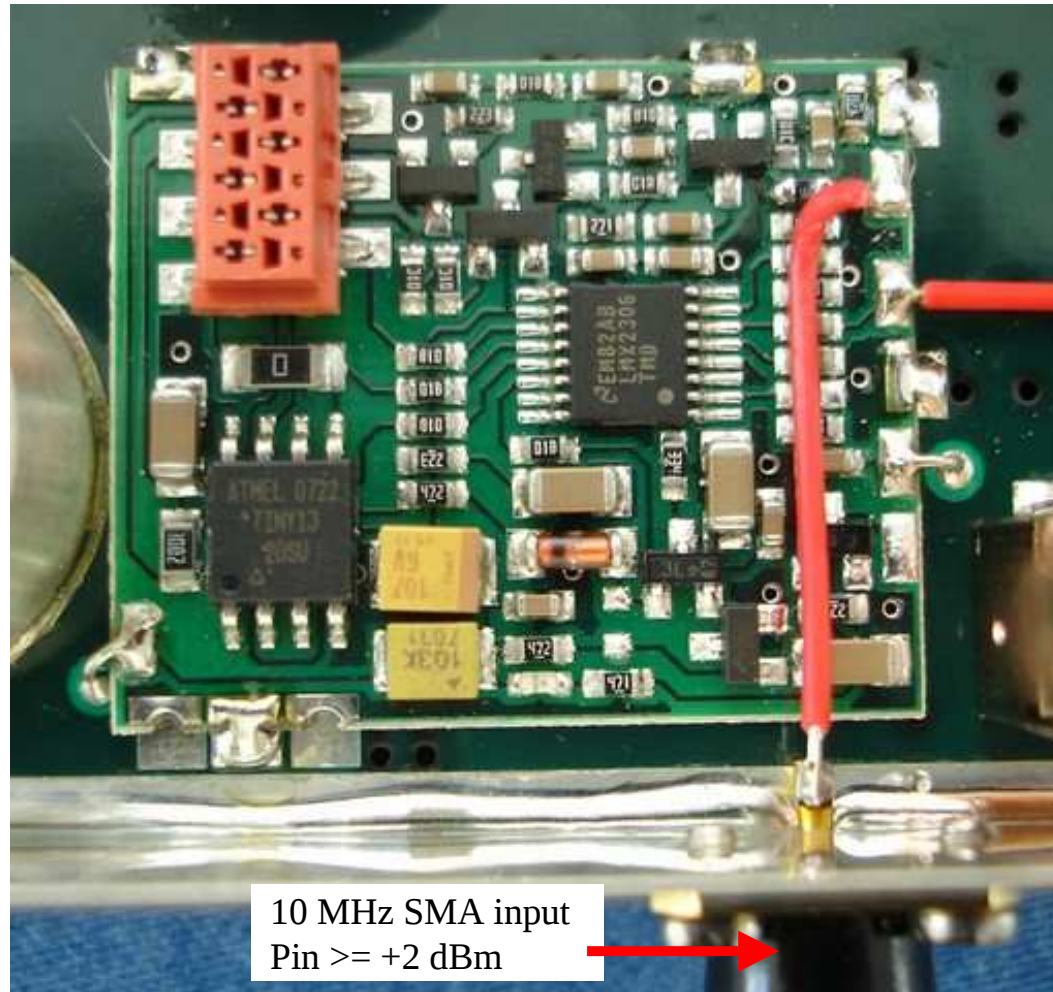
Printboard rear view



DB6NT V3 with external 10 MHz OCXO input

Printboard rear view

10 MHz PLL



10 MHz SMA input
Pin $\geq +2$ dBm

Low cost chinese
10 MHz OCXO



10 MHz outputs

12V 10 MHz OCXO
Pout= +6.8 dBm

6- Linear gain, Nf and output power

Measurements on different 5.7 and 10 GHz transverters

Linear gain & Nf

10 GHz (or 5.7) output power with +30 dBm on 2 meter

Rx mode

Tx mode

Measures from 11.5 to 14.8V	Brand	I mA T=0	I mA T=10'	Gain lin dB	Nf dB		I mA Tx	Pout dBm	Pout W	Conclusion Pout
<i>XRM-1 + XTM-1 + XLO-1 opt 001</i>	SSB Electronic	?	?	?	spec 2.5		?	+23.5	0.224	Inside specs
<i>MKU 57 G2</i>	DB6NT	320	250	20.3	1.3		400	+23.7	0.234	Inside specs
MKU 10 G2	DB6NT	300	200	19.8	0.68		450	+21.3	0.135	Pout under specs
MKU 10 G2 FI 432	DB6NT	300	?	?	?		?	+21.1	0.129	Pout under specs
MKU 10 G2 + OCXO 106,5 MHz	DB6NT	700	375	17.5	0.63		550	+23	0.197	Pout a little just
MKU 10 G3 + OCXO 10 MHz	DB6NT	275	213	27.3	0.75		436	+23.6	0.237	Inside specs

Remarks :

- In Rx mode, I decreases after 10 minutes when the CTP/quarz group is hot and regulating
- 10 GHz G2 models : **20% output power** decrease after 15 to 20 minutes warm-up time
- G3 model : no significative power decrease but brand new one
- *SSB Electronic and DB6NT with 432 MHz IF transverters no more at measuring place, sorry*

Measurements on different 5.7 and 10 GHz transverters

Measuring conditions

HP 8970a	Gain / Nf analyser
Ailtech 7616	15 dB ENR diode
HP 436a	Digital power meter
HP 8481a	10 MHz -18 GHz +20 dBm max power sensor
JFW	20 dB 2W attenuator
HP 8498a	30 dB 25W power attenuator
FT-817nd TRx	1W on 144 MHz

Remark :

HP 8498a & JFW : attenuation measured especially at 5.7 and 10.36 GHz with an HP 8756a scalar analyser