

Microelectronics Technology wideband amplifier



Target

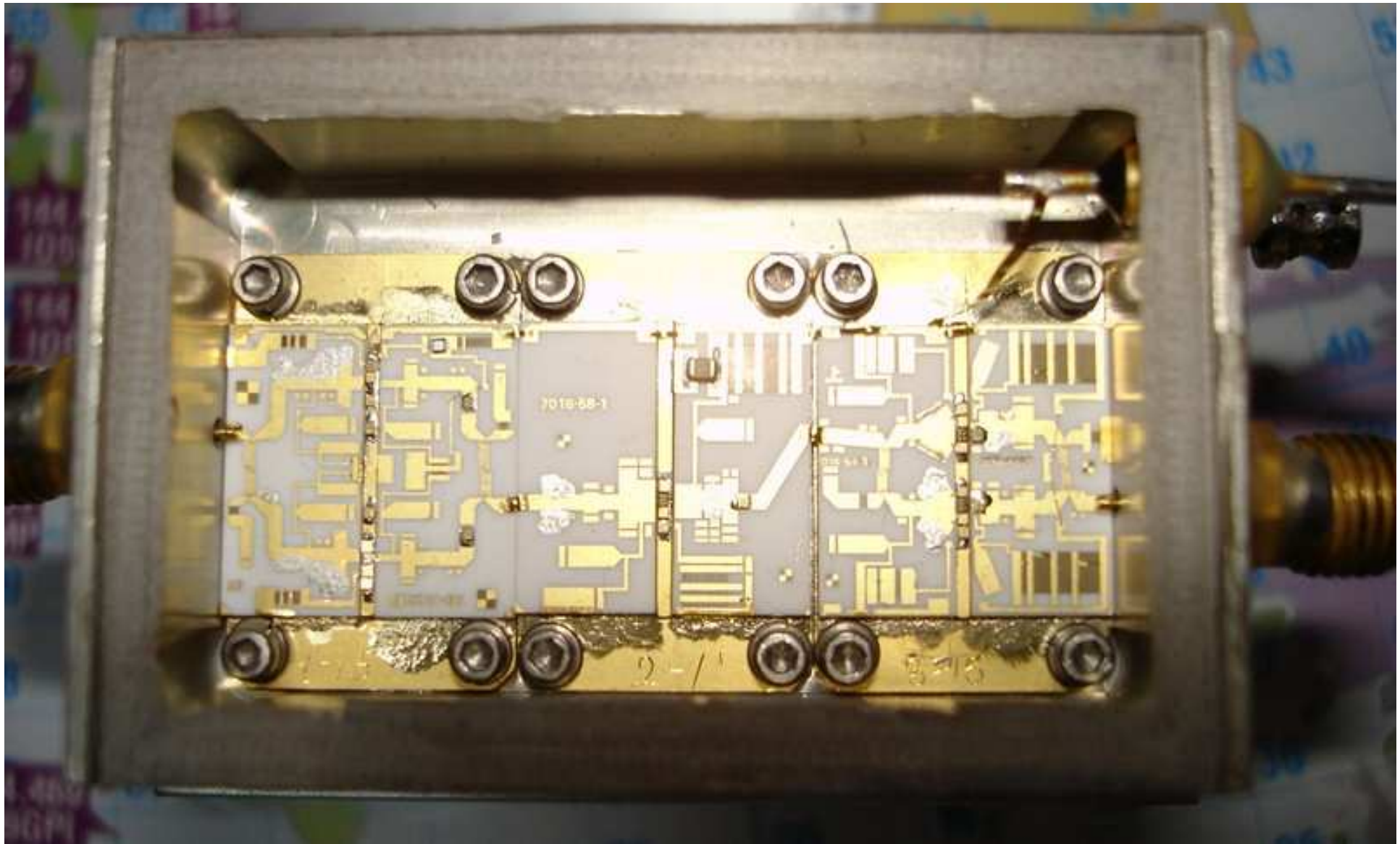
After buying it on eBay to a german ham, is this amplifier also **useful on 10.4 GHz ?**

- Initial manufacturer purpose : linear booster for the DBS band
- **Ham target** : getting a **10.37 GHz post booster after an HP 8350 sweep** (+17 dBm max leveled power), in order to **obtain +23 to +25 dBm** and avoid the couple (10 GHz DB6NT transverter + TRx) for 10 GHz PA output power meases

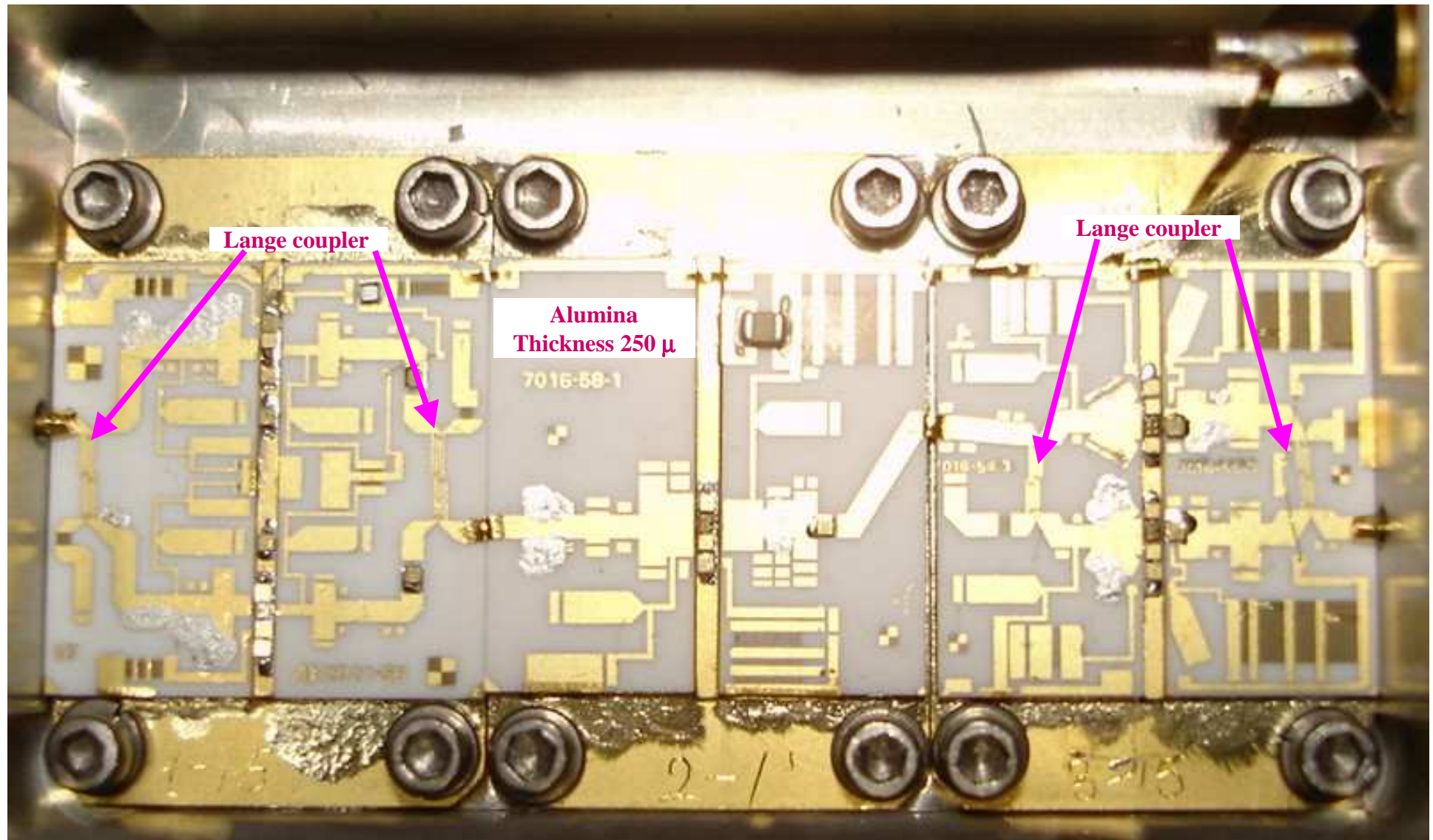
Abstract

- Broadband RF gain / Nf measures - - outside the initial 11.7 – 12.5 GHz
- Power measures at 12.2 GHz, then on 10.4 GHz
- First conclusion
- First stub tryings
- New resulting Pout = F_Pin measures à 10.37 GHz
- Final conclusion

Internal view



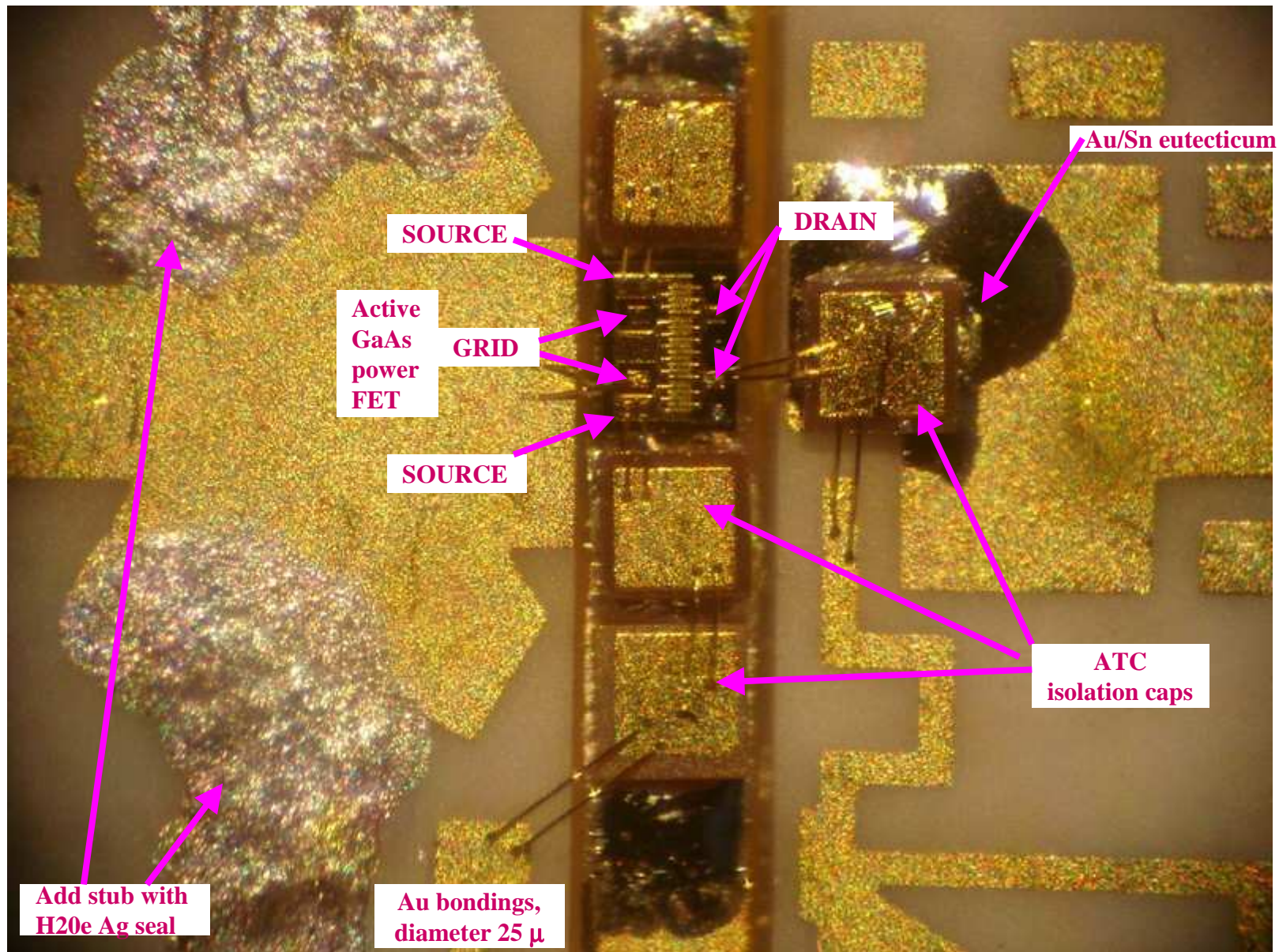
Zoomed internal view



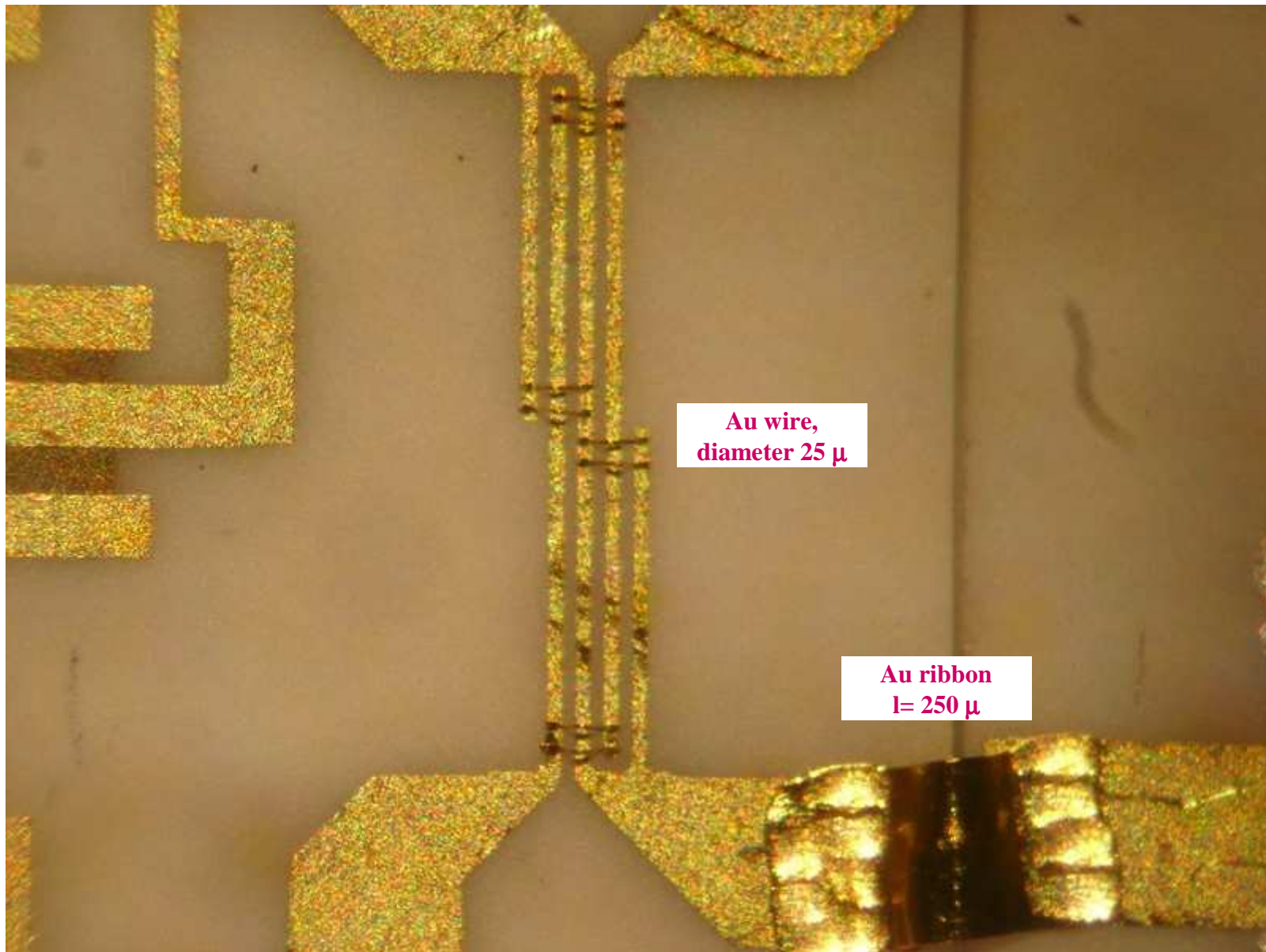
F5DQK July 2009

M-T-I SA82-1826R preamp

Internal view : zoom round one FET



Internal view : zoom on Lange coupler



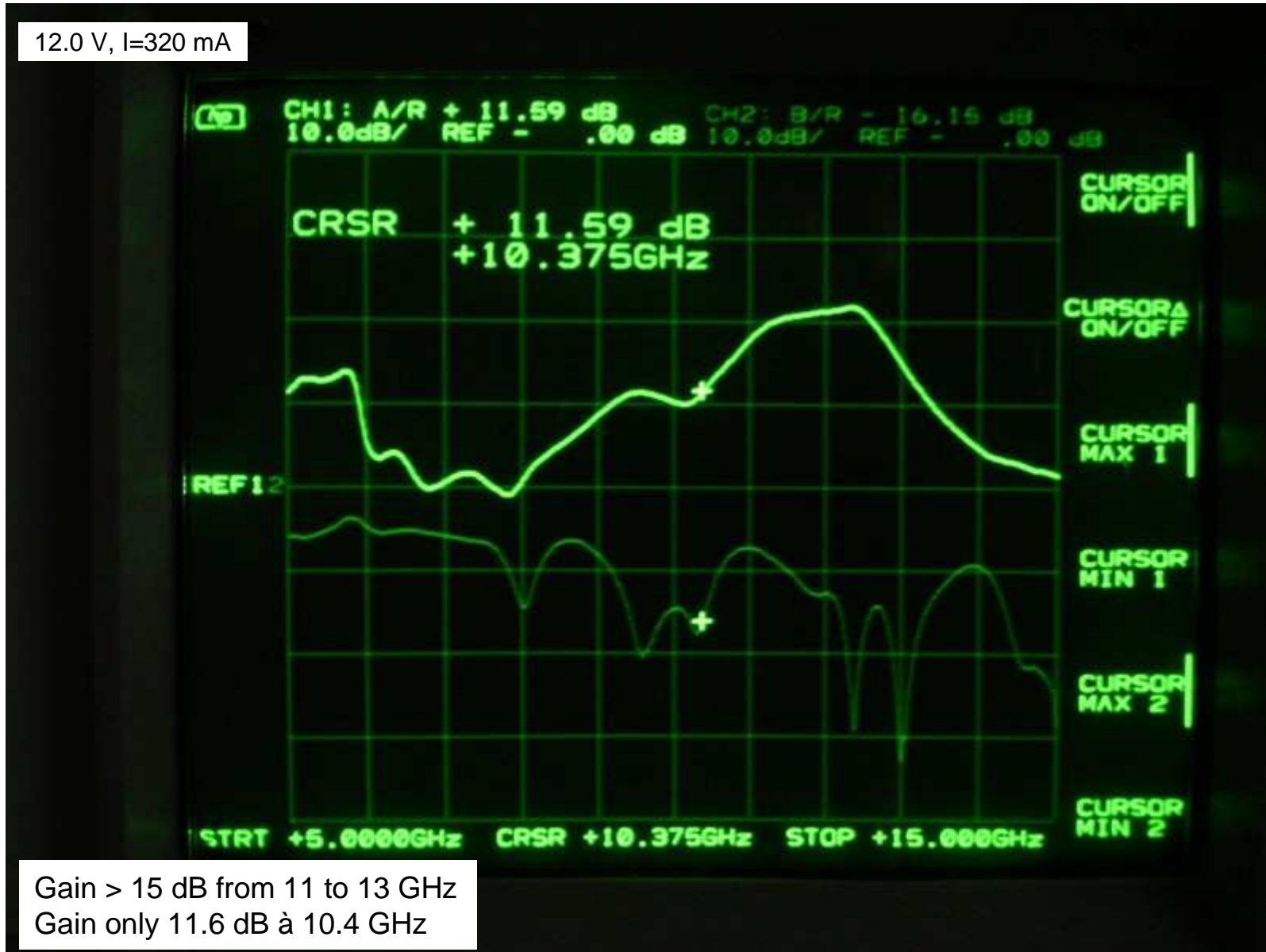
Cover



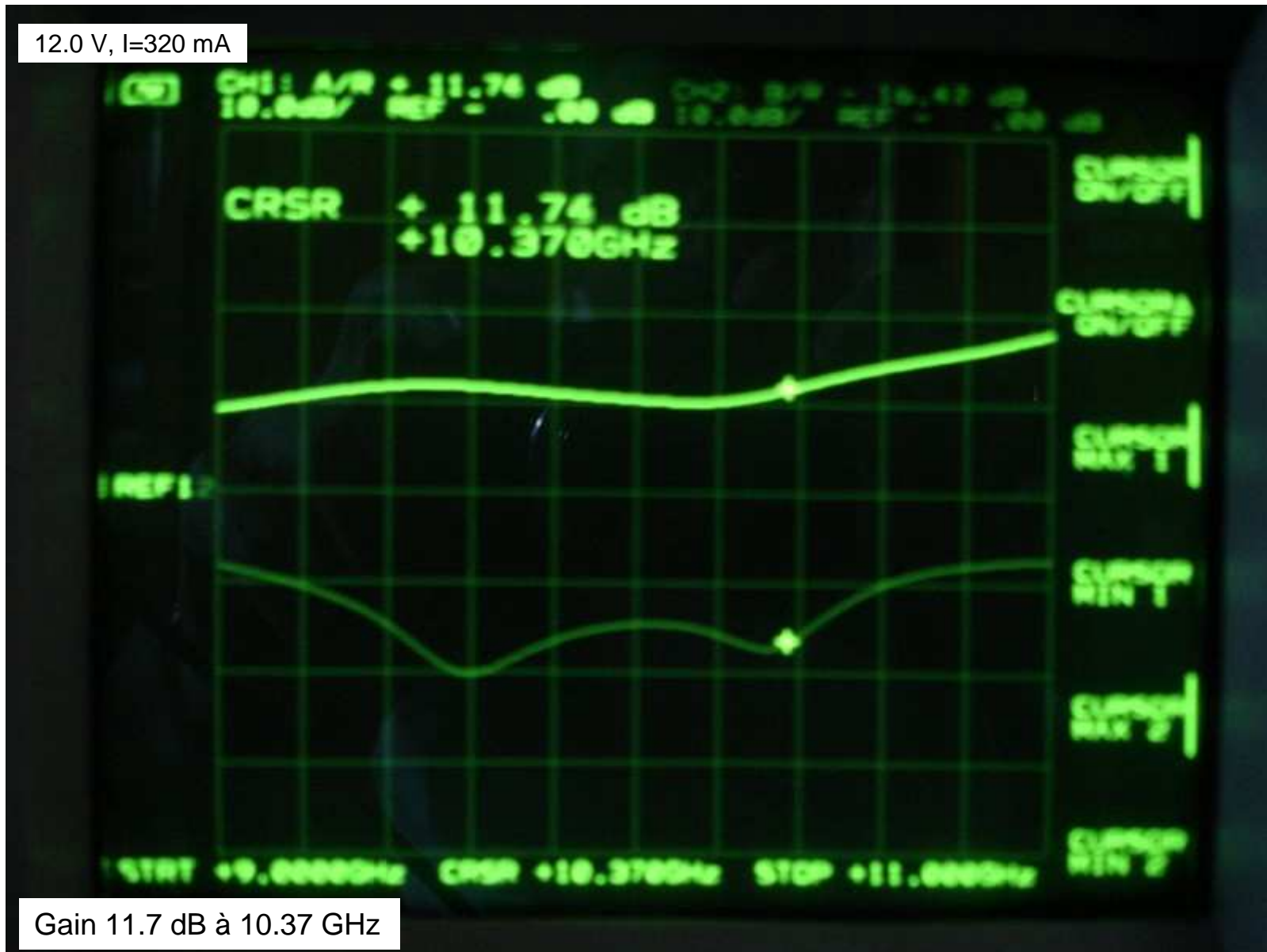
DC conditions

- U variable between 8 and 15V
- I=320 mA à 12.0V

Broadband scalar analysis



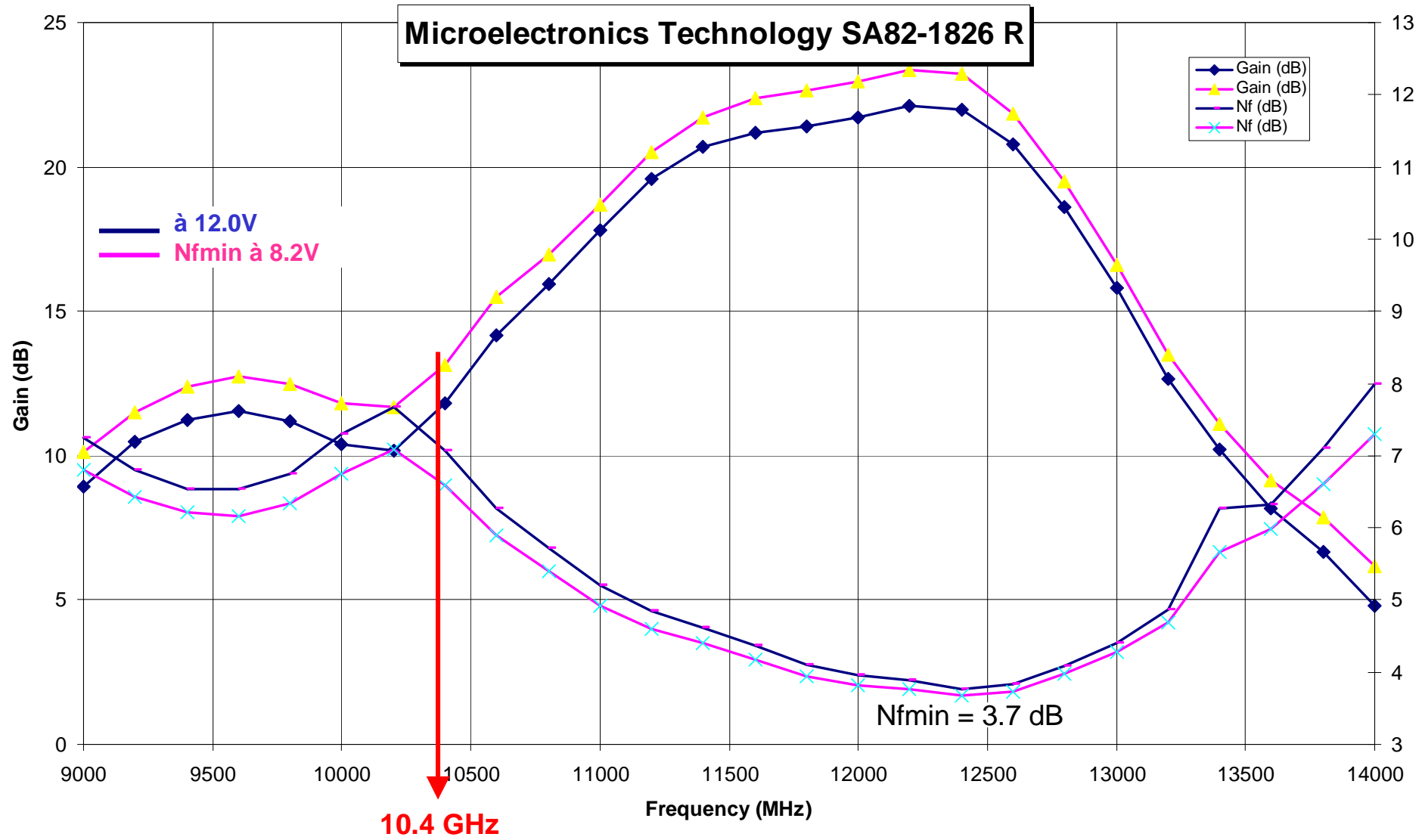
Broadband scalar analysis (zoomed)



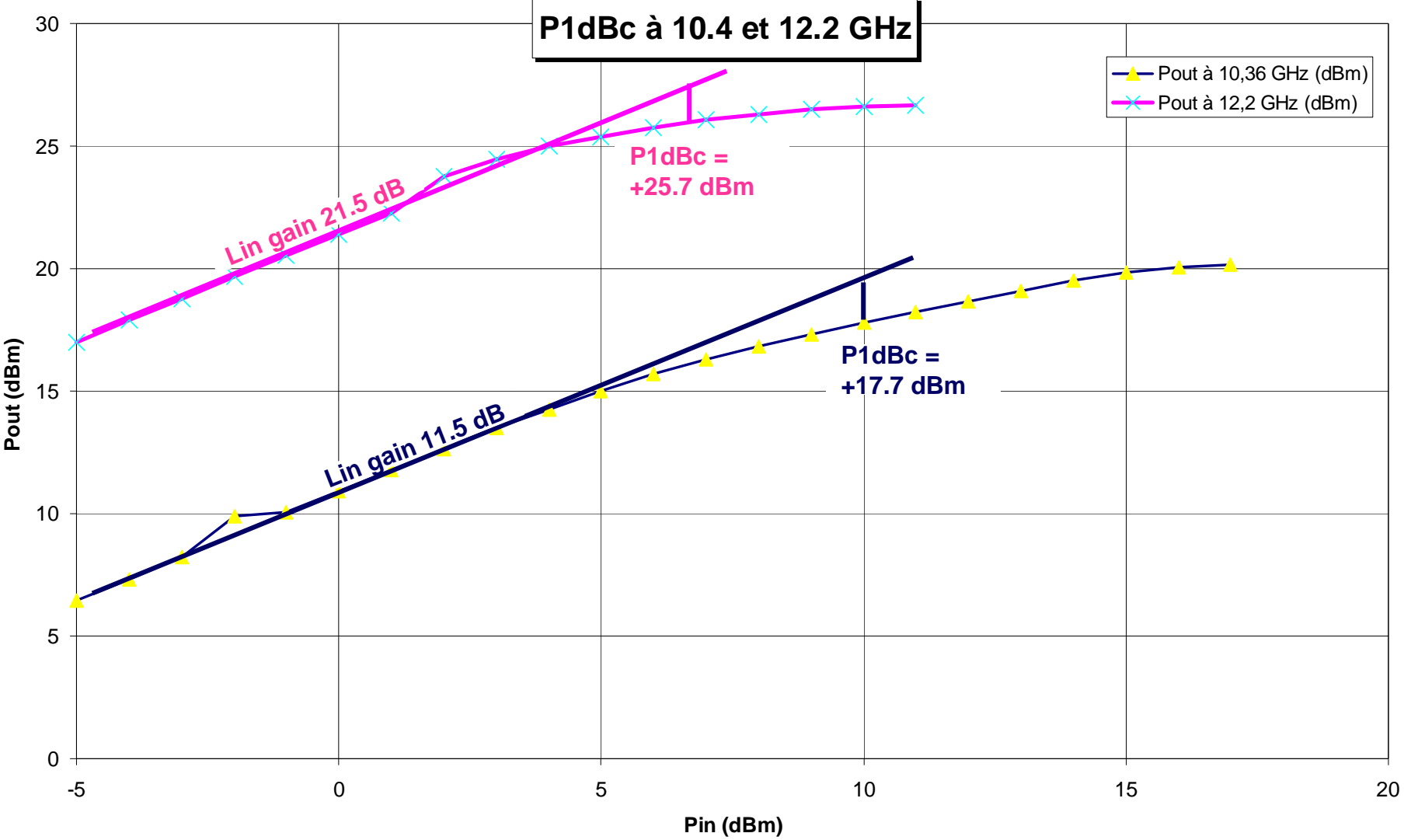
Broadband scalar analysis (zoomed)



Gain/Nf analysis



Power analysis



First conclusion

A 12.2 GHz:

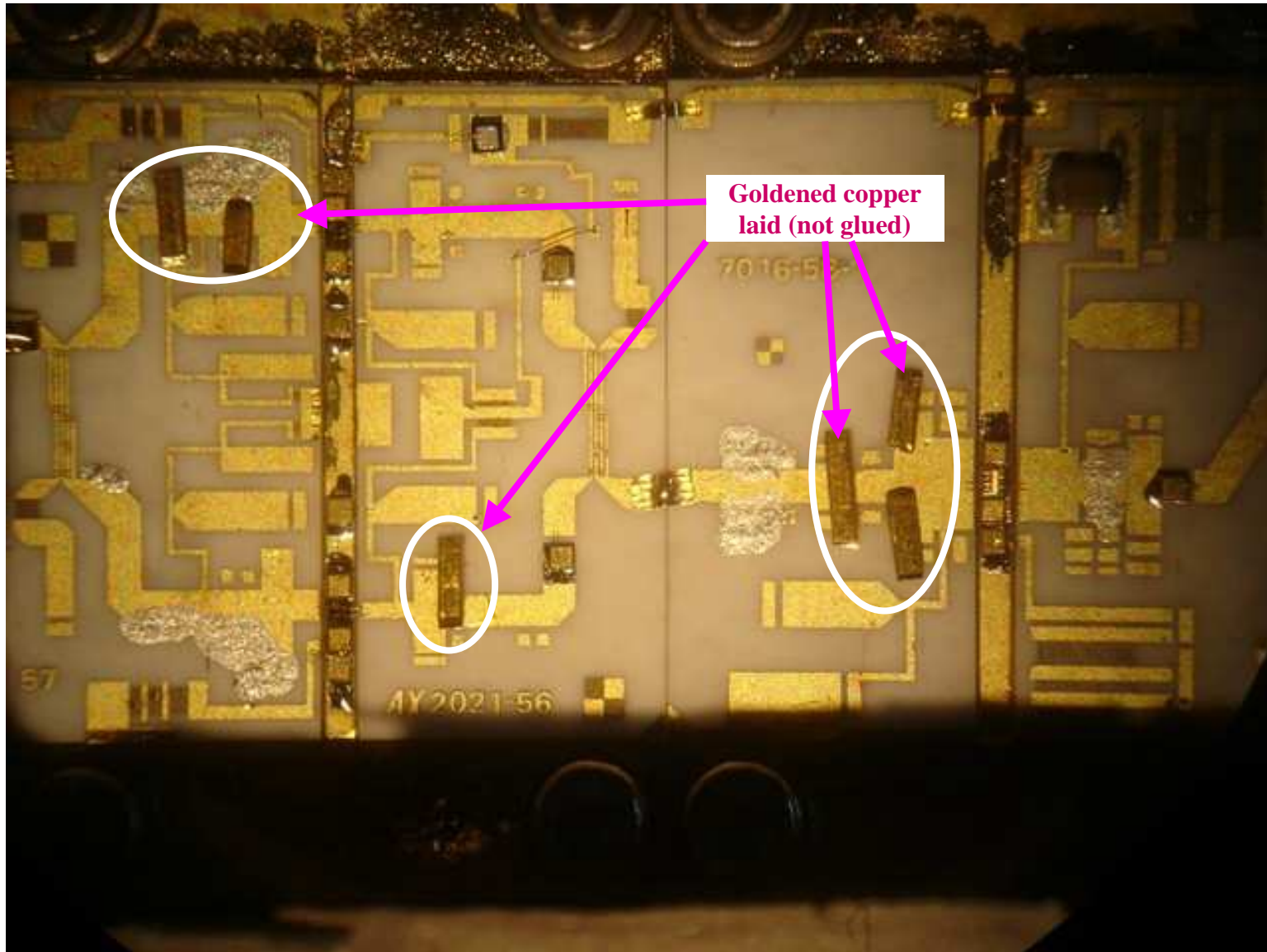
- P1dBc = + 25.7 dBm or 372 mW
- Lin gain = 20.5 dB
- Psat = + 26.7 dBm or 470 mW
- Nf_min = 3.7 dB à 12.5 GHz = a little high

A 10.4 GHz:

- P1dBc = +17.7 dBm or 59 mW ONLY !!!
- Lin gain = 10 dB
- Psat = +20 dBm or 100 mW ONLY
- Nf = 7 to 8 dB → too high

- **Absolutely not intended for our 10.4 GHz ham band « as is » without stubbing !!**
- Very difficult to open its sealed cover

First stub tryings



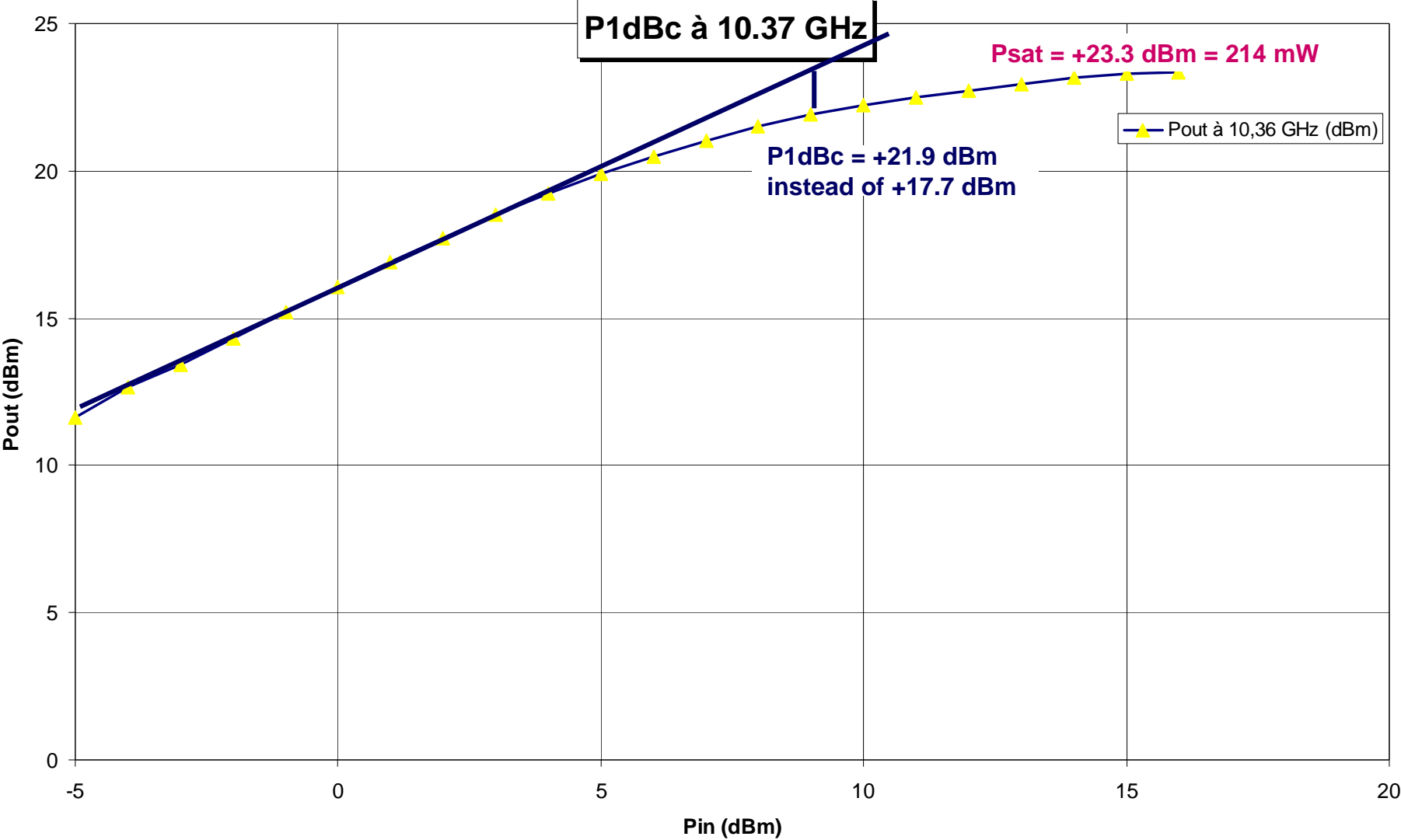
New broadband scalar analysis

11.2 V, I=320 mA



New power analysis

11.2 V, I=320 mA



Last conclusion

- **DB6NT 10 GHz transverter replacement with an HP 8350 sweep boosting ? Possible but actually too just – and max power not obtained on linear mode !**
- P1dBc à 10.4 GHz of only +22 dBm instead of initially +17.7 dBm with stubing improvement
- A little far from the initial +25 dBm output got à 12.2 GHz

Output power and gain à 10.4 GHz limited by :

- Too little dimensions à 10.4 GHz of the 4 Lange couplers
- Worse efficiency of the manual stubing tries

Possible stubing improvements by :

- Au bondings to all foreseen Au pads on the aluminas with a wedge bonding machine (Kulicke & Soffa). That really gives very stable and reproducible stubs
- Taking-off each new Au bonding → looking its effect on the resulting linear gain à 10.4 GHz
- Final work done at high RF power feeding