

EME and MW seminar of OK VHF club 2023 - Medlov

# 432, 1296, 2320 MHz SSPA for outdoor installation

OK1DFC - ZDENEK SAMEK



# Description:

- Need to install SSPA directly in the dish
- Minimal losses in the coaxial cable
- Minimum power losses 50 and 28 V - DC - 50 and 46 A - DC

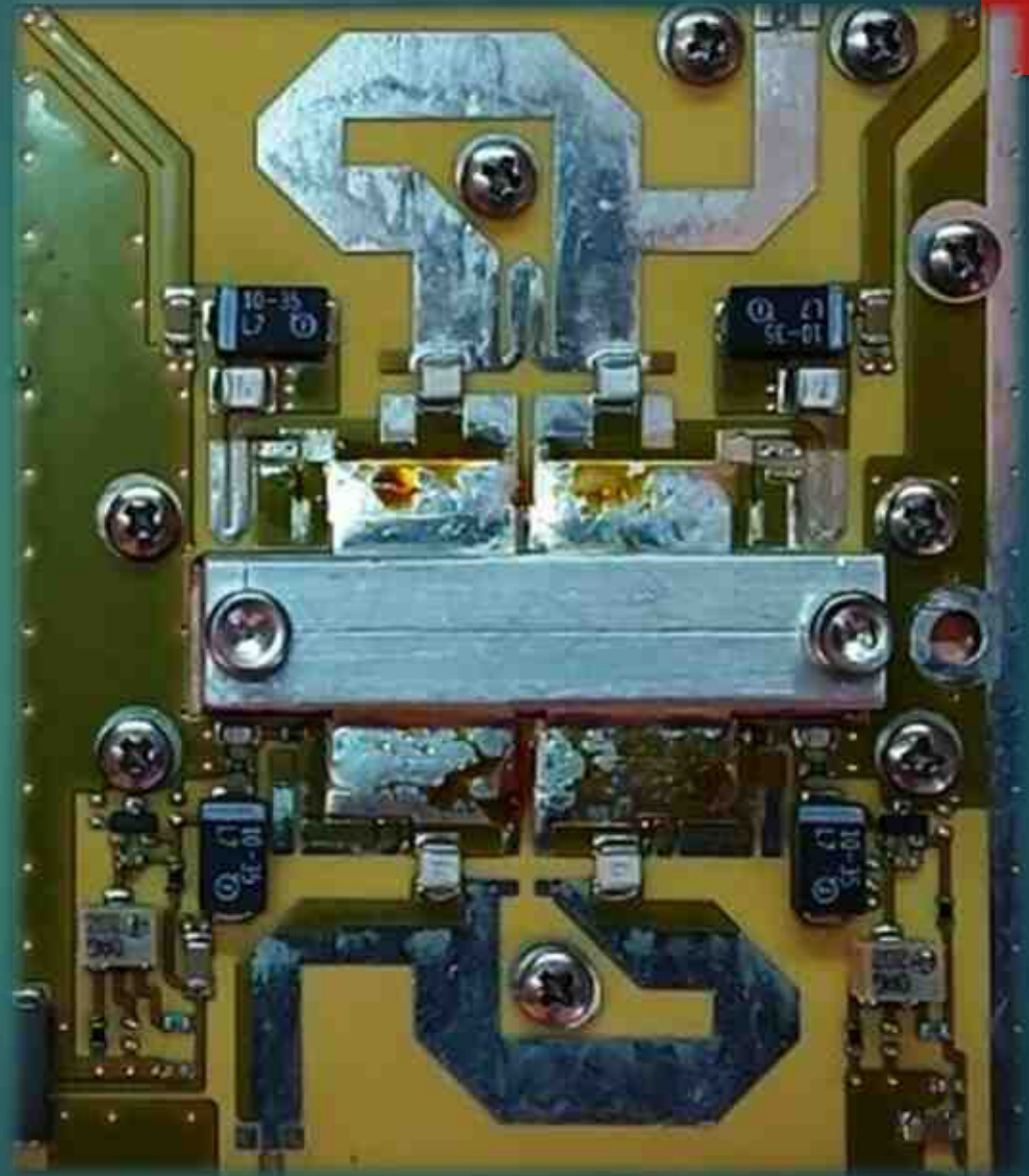
# Feed holder as SSPA carrier



- Front and rear view of the parabolic mirror
- 50/2 mm feed holder tubes as 1" coax protectors

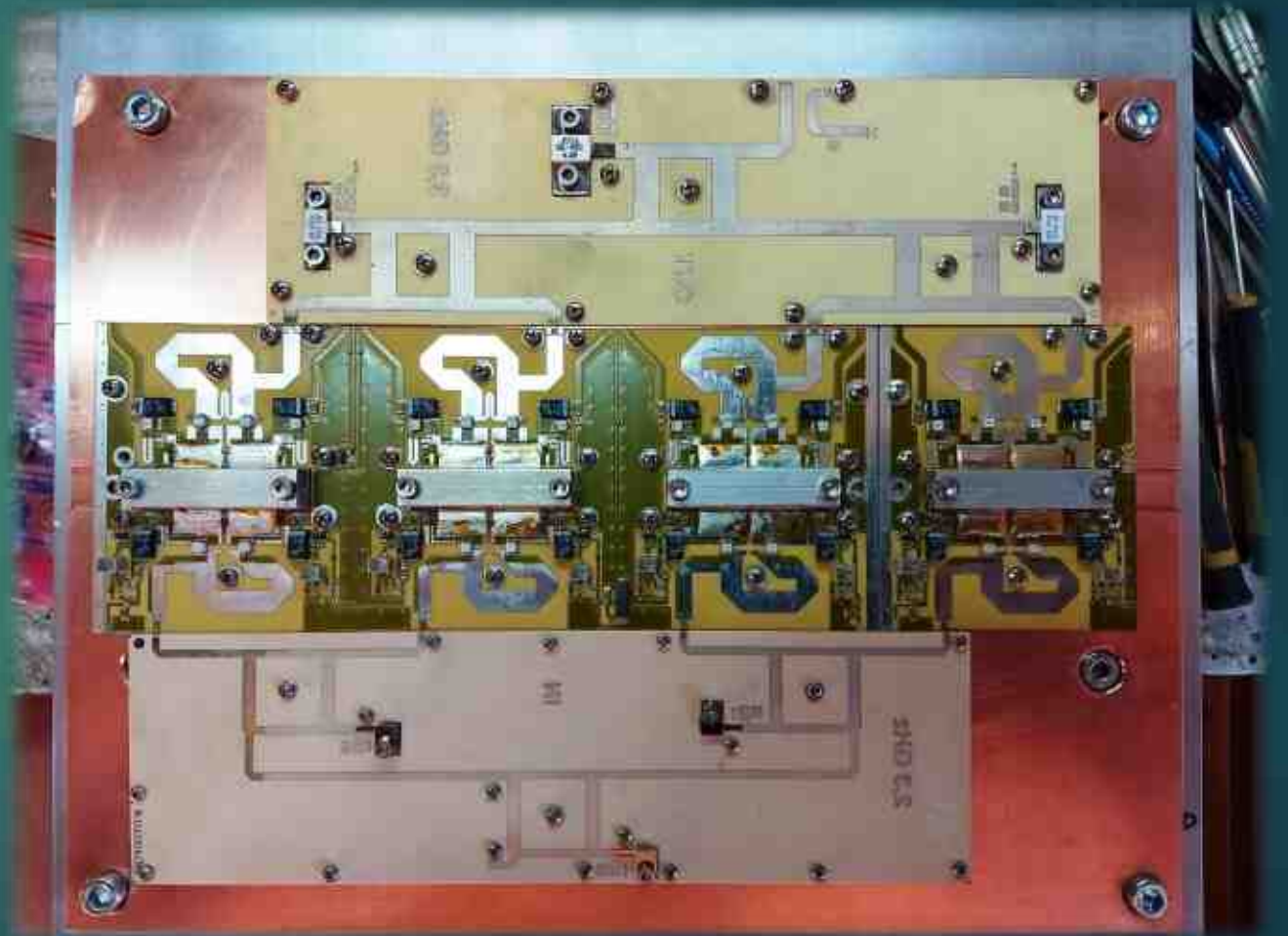
# 2320 MHz SSPA

- Used 4 pcs of modules with SRF21120 (military equivalent of MRF21120 transistor)
- Power supply 28 V - DC / 12A - DC
- 12 V - DC bias voltage - solved as +12V TX PTT



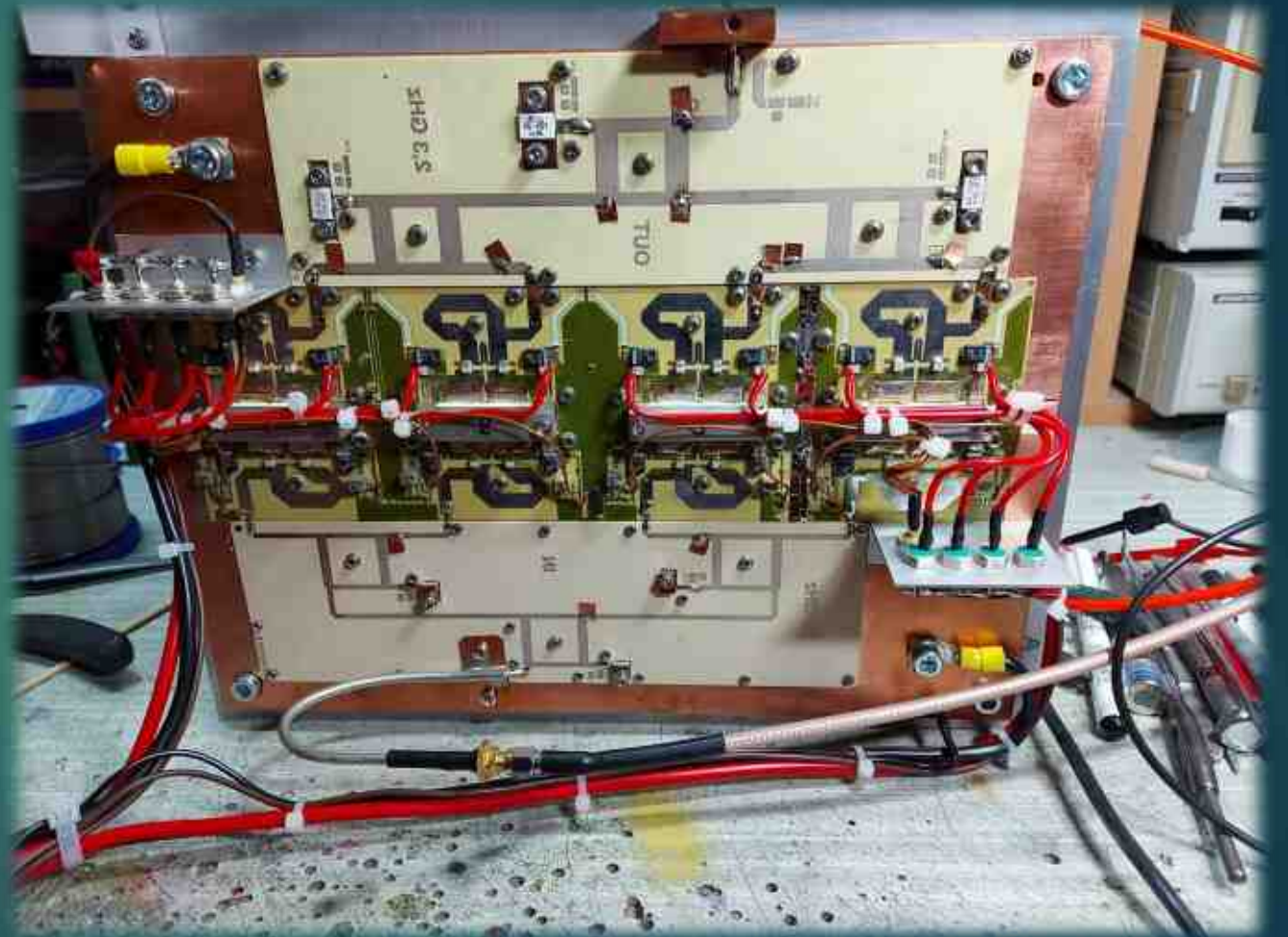
# 2320 MHz SSPA

- For mounting to the radiator Cu plate 12mm
- Milled and polished 1.5mm groove for transistors
- Contact heat-water paste
- Connector and splitter 1/4 made on ROGERS material
- Terminating 50 ohm non-inductive resistors for 90° hybrids
- Milled duralumin bridges 10x10mm for pulling transistors to heat sink



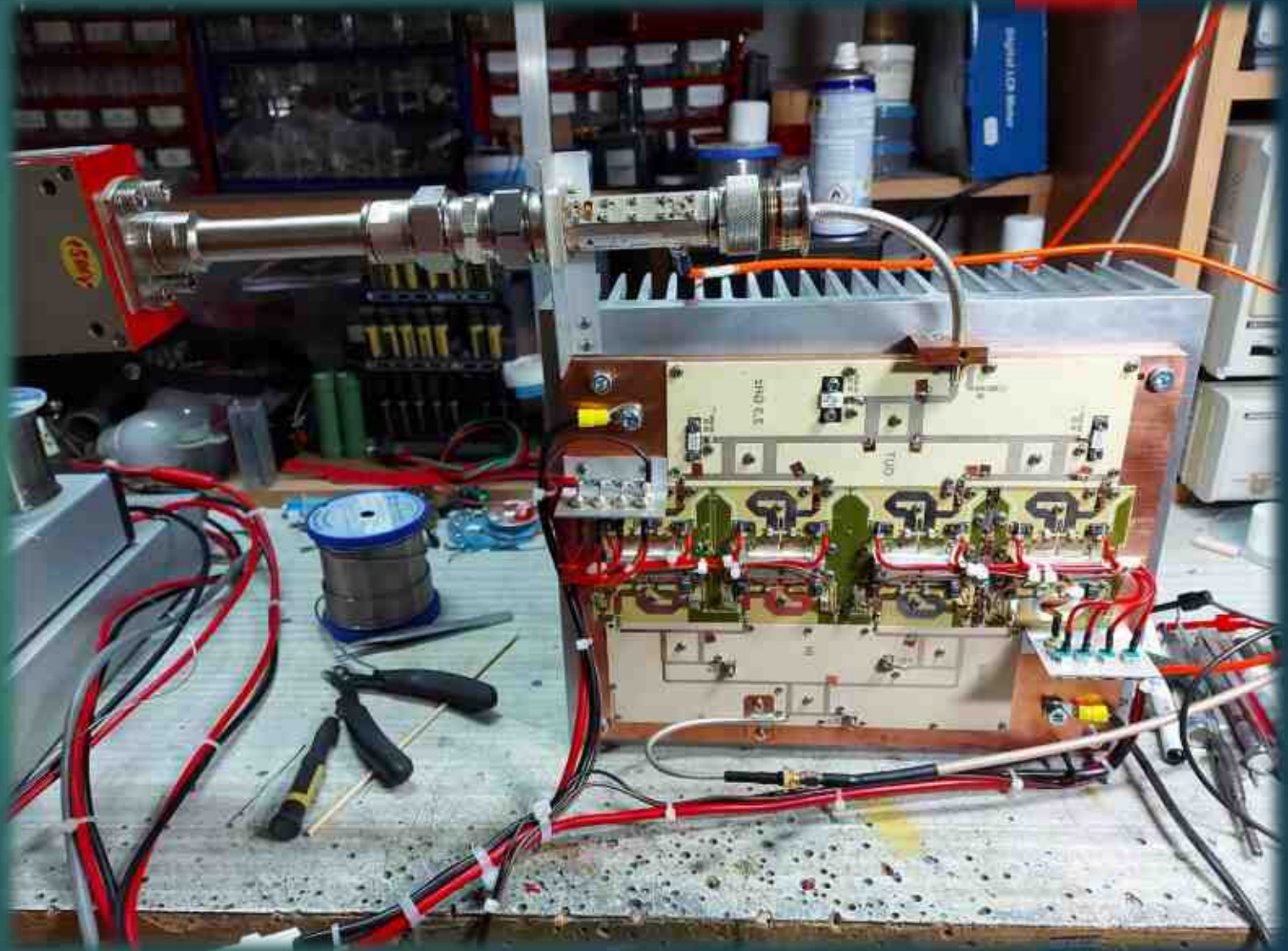
# 2320 MHz SSPA

- Power Cables
- Grommets
- +12V TX PTT bias source - grommets
- SMA input
- Output 7/16 - KETHREIN taps



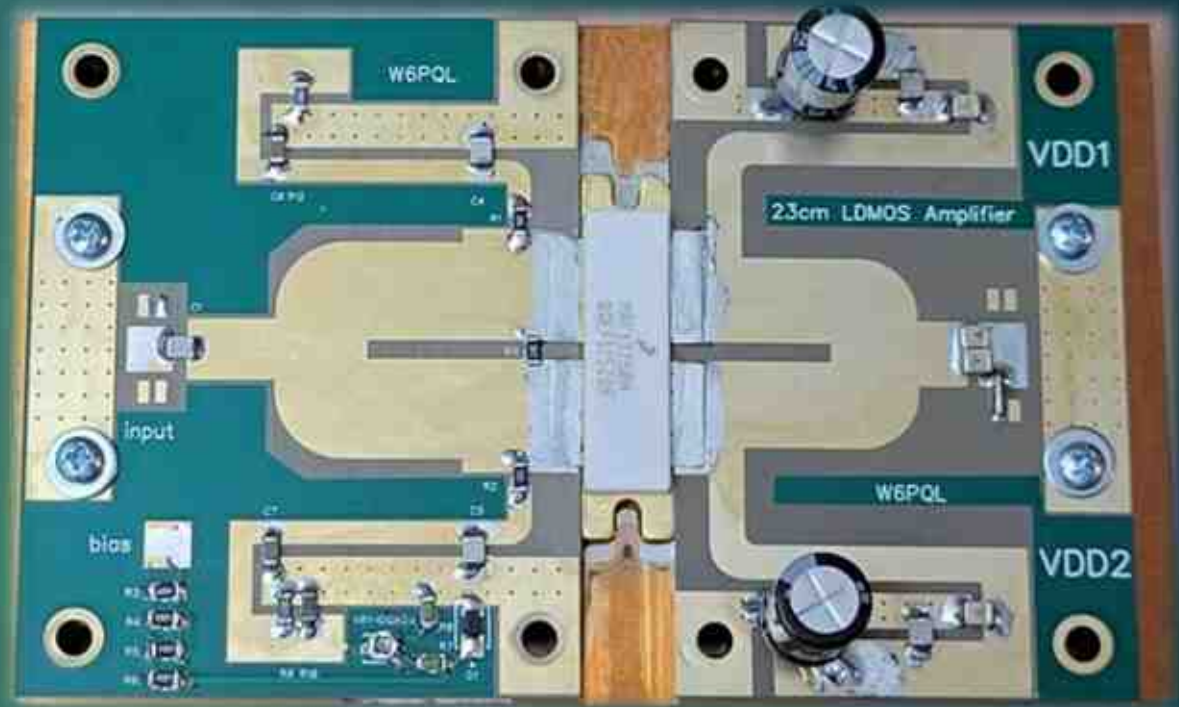
# 2320 MHz SSPA

- A general view of the revived and adjusted SSPA
- 28V / 46A DC
- 15dB gain
- 57dBm output power
- 42dBm input power



# 1296 MHz SSPA

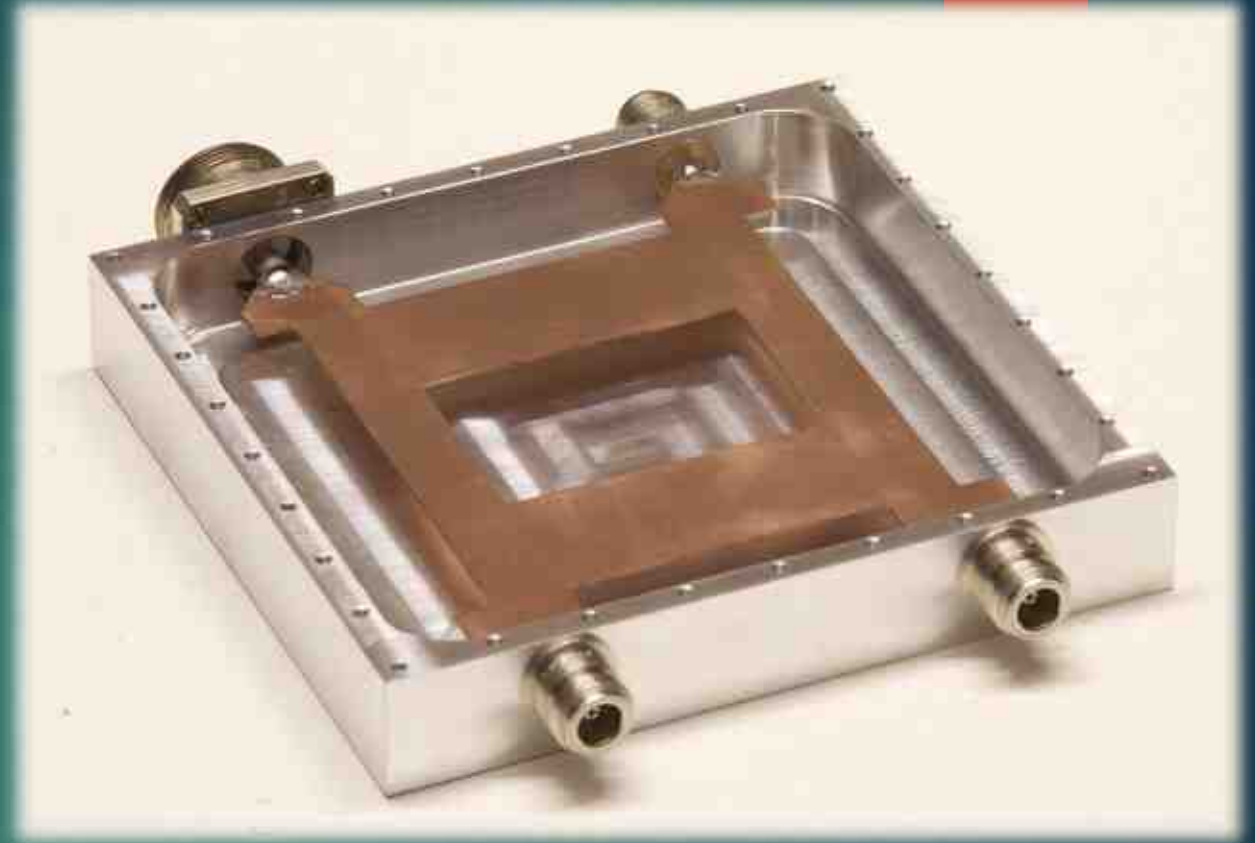
- Used 2 pcs of **W6PQL** modules with NXP **MRF13750H** LDMOS transistor
- Power supply 50V - DC / 25A - DC
- Pre-voltage 12V/30mA DC - designed as +12V TX PTT
- 10W excitation (15W max.) for 600W or more output power





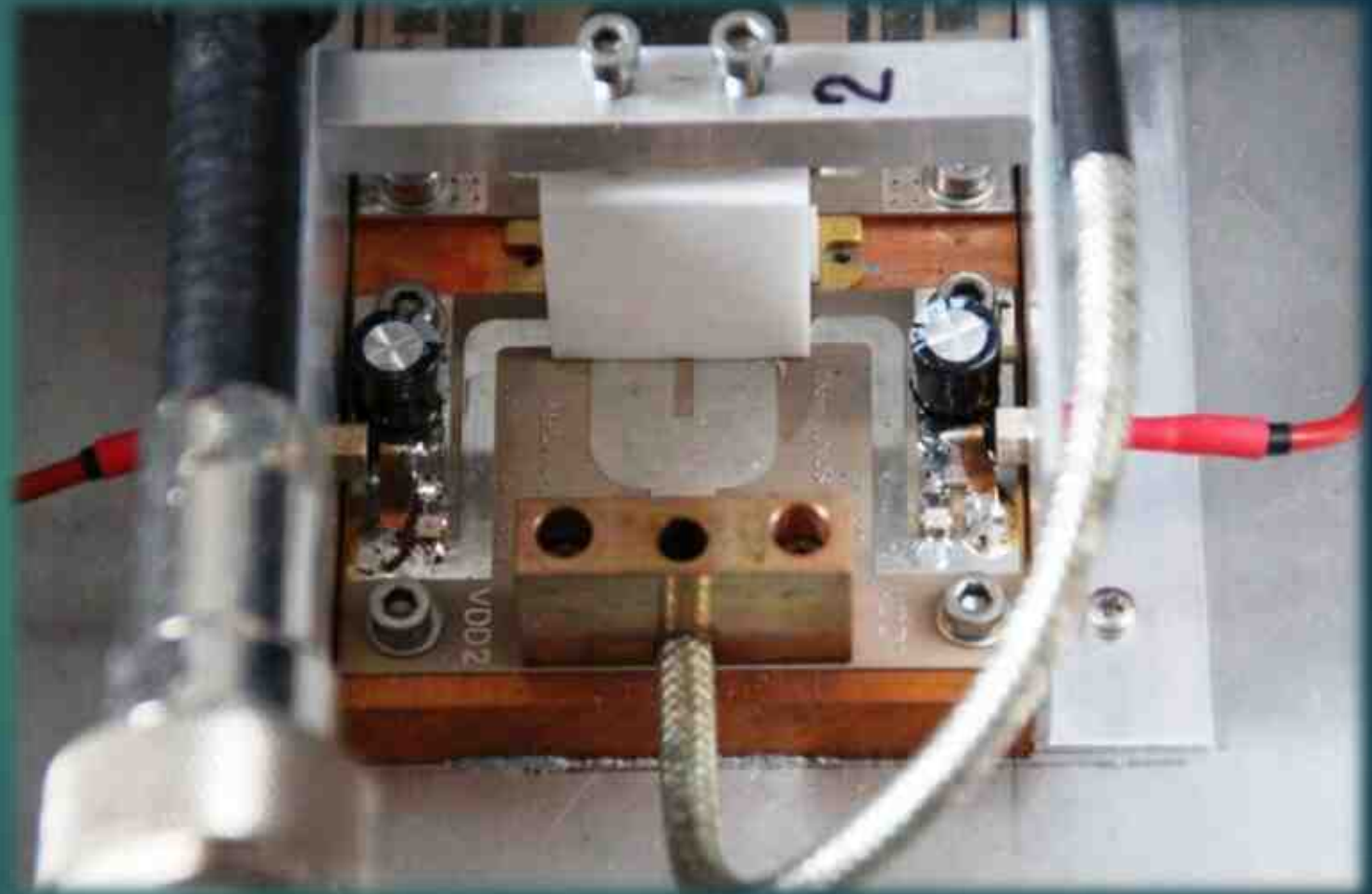
# 1296 MHz SSPA

- SSPA power branching and merging
- SMA input - W6PQL 90° hybrid on Rogers material
- Output DJ9BV design with 7/16" output connector
- Termination resistance 800W

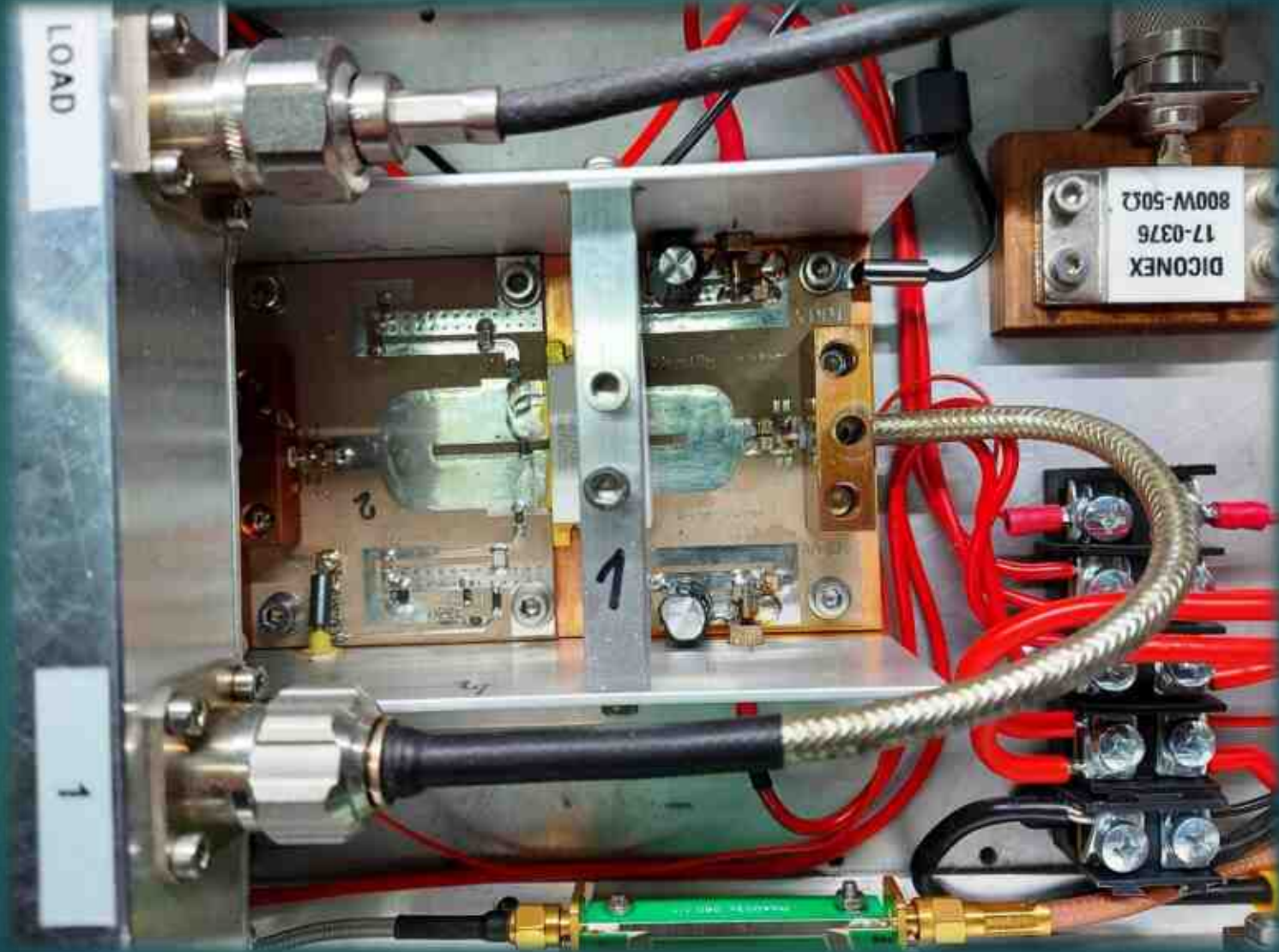


# 1296 MHz SSPA

- RF output control from the module
- Departure D exit
- Cooling problem with power output
- PTFE pressure plate
- Better heat transfer from PCB to Cu heat sink

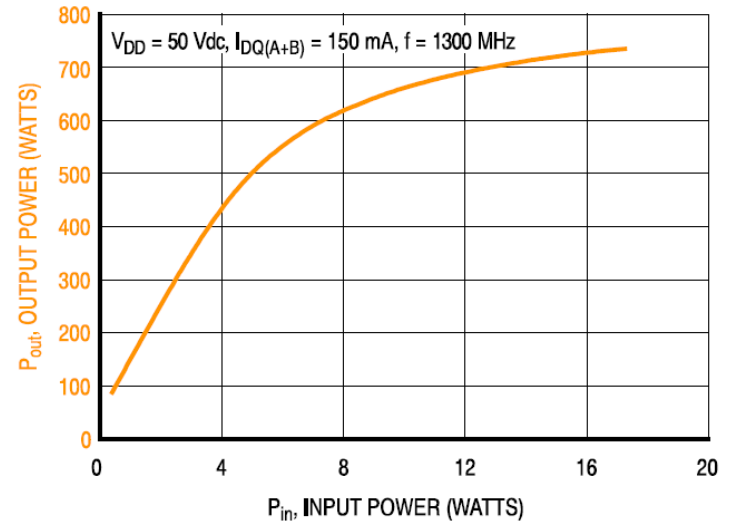
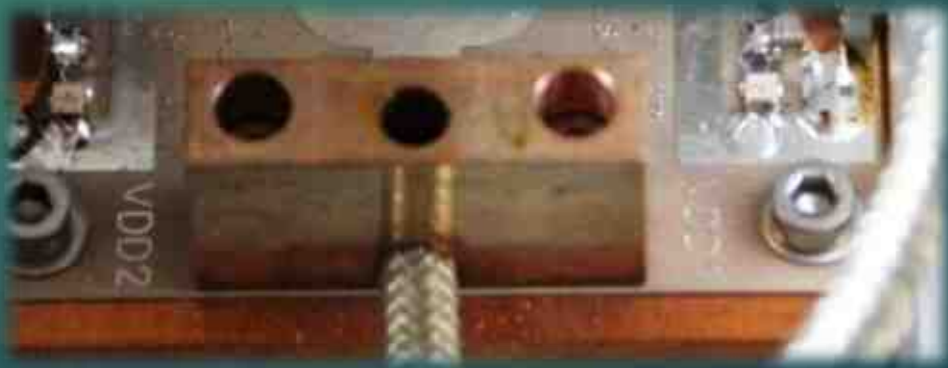


# Module detail



# 1296 MHz SSPA

- Transistor soldered with low-temperature-melting solder on copper plate
- Output coax attached with copper bridge and 2xM3 imbus anticoro



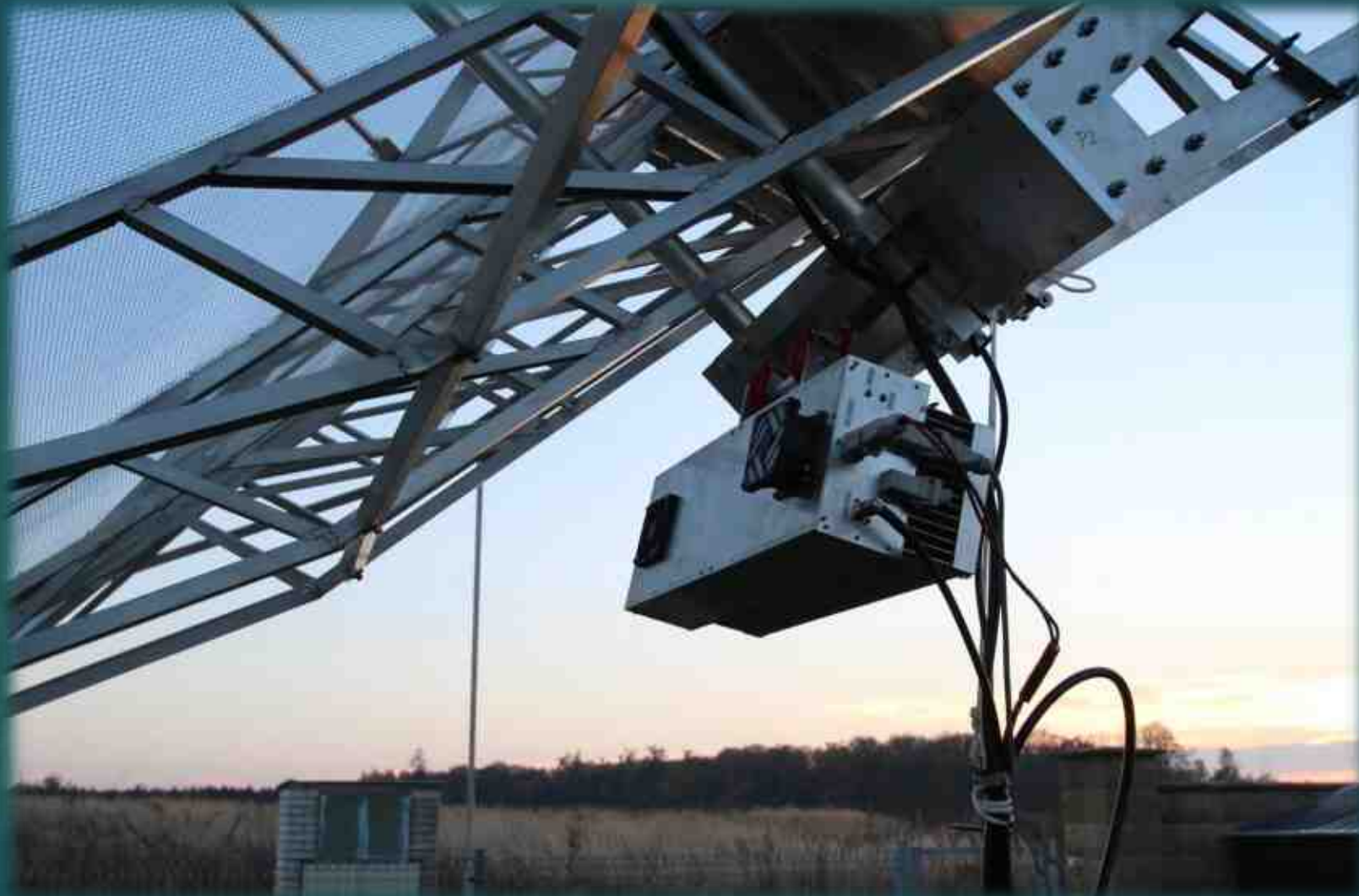
f (MHz)	P1dB (W)	P3dB (W)
1300	600	710

# 1296 MHz SSPA



- Used 2 pcs of **W6PQL** modules with **NXP MRF13750H** LDMOS transistor
- Power supply 50V - DC / 50A - DC
- Pre-voltage 12V/30mA DC - designed as +12V TX PTT
- Cooling 2 x 48V-25W axial fans
- 25W input - **1248 W** output power - CW

# SSPA in parabola

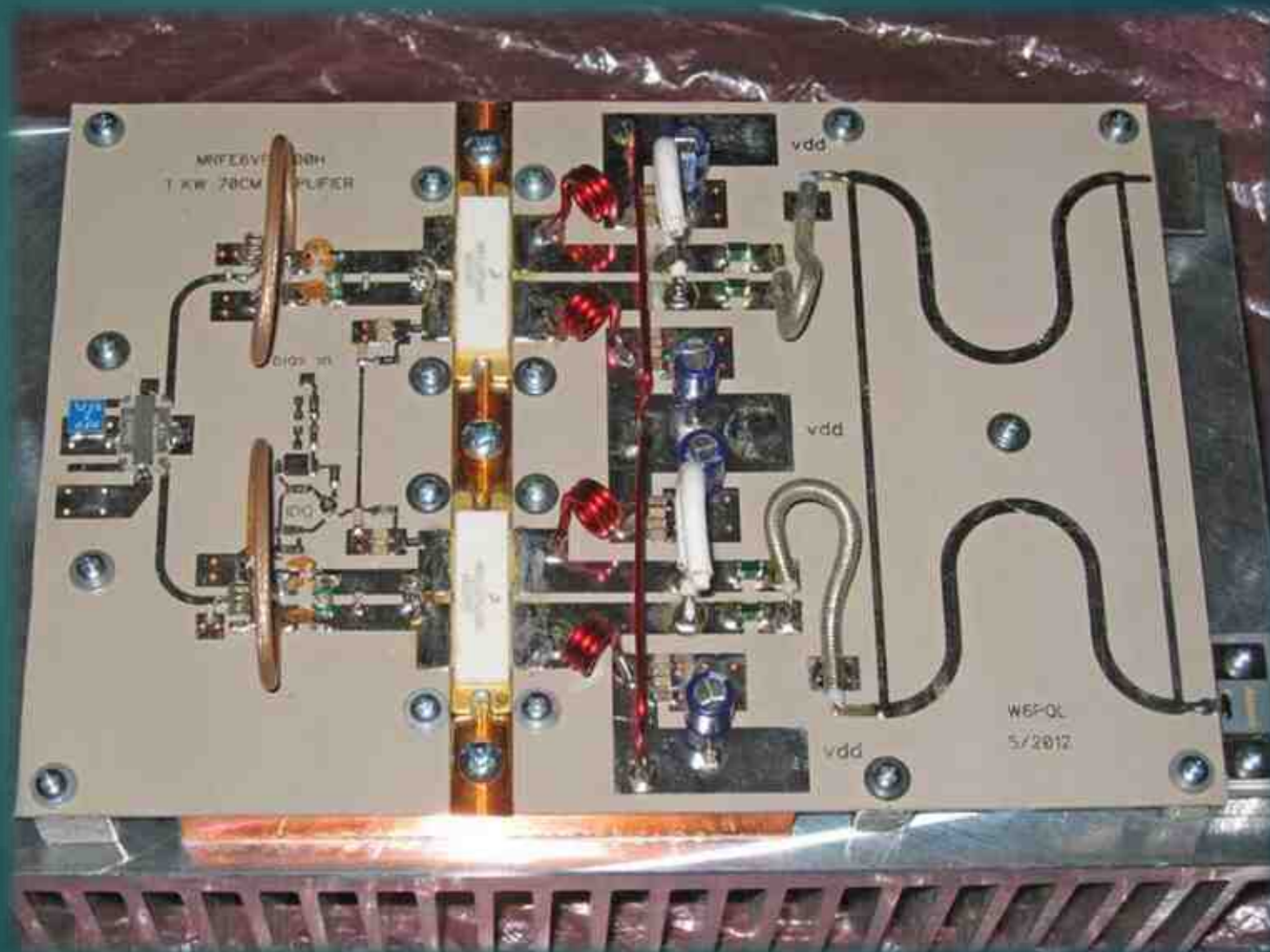


# SSPA in parabola



# 432 MHz SSPA 1.2kW

- Shipment

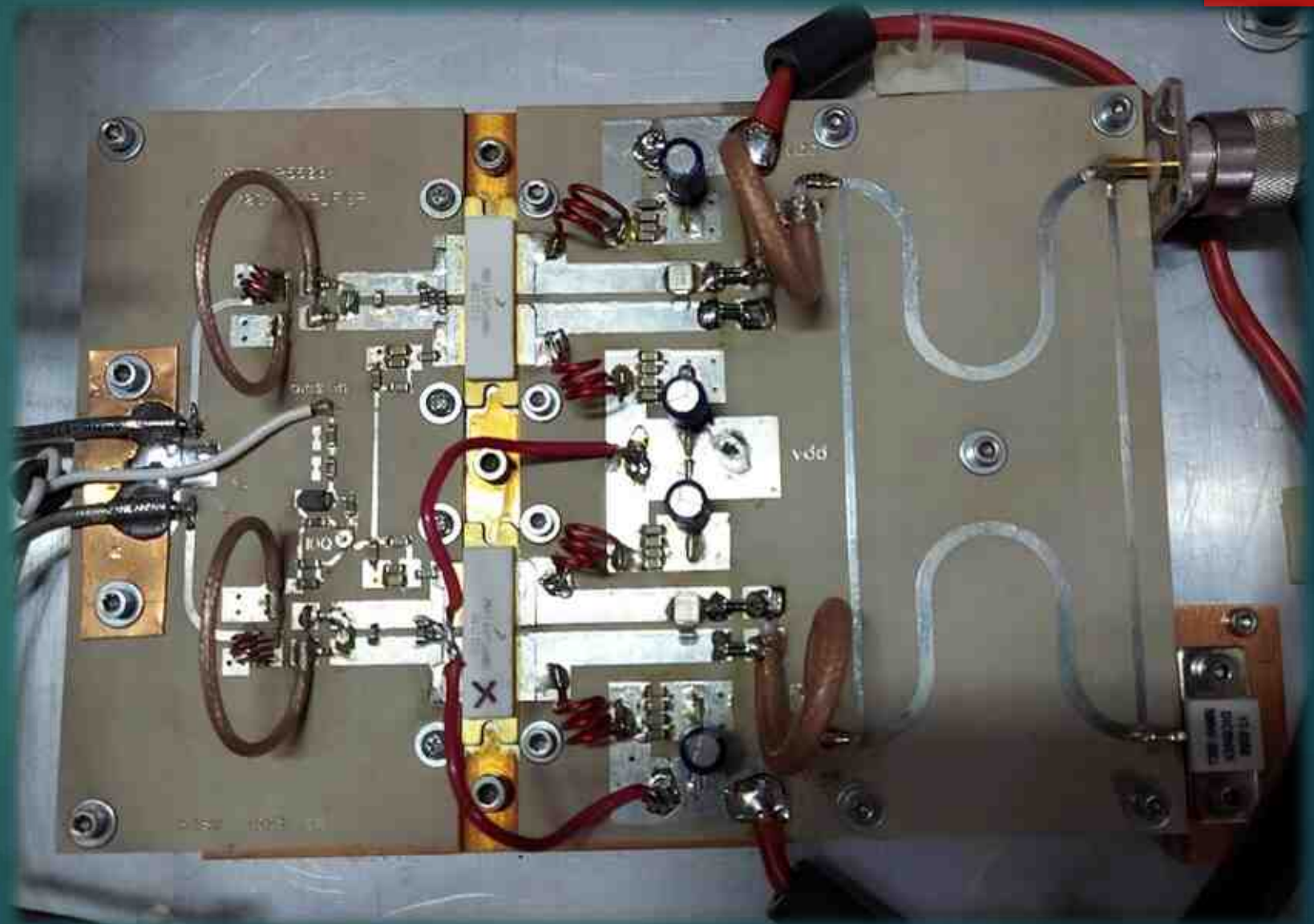




# 432 MHz SSPA

## 1.2kW

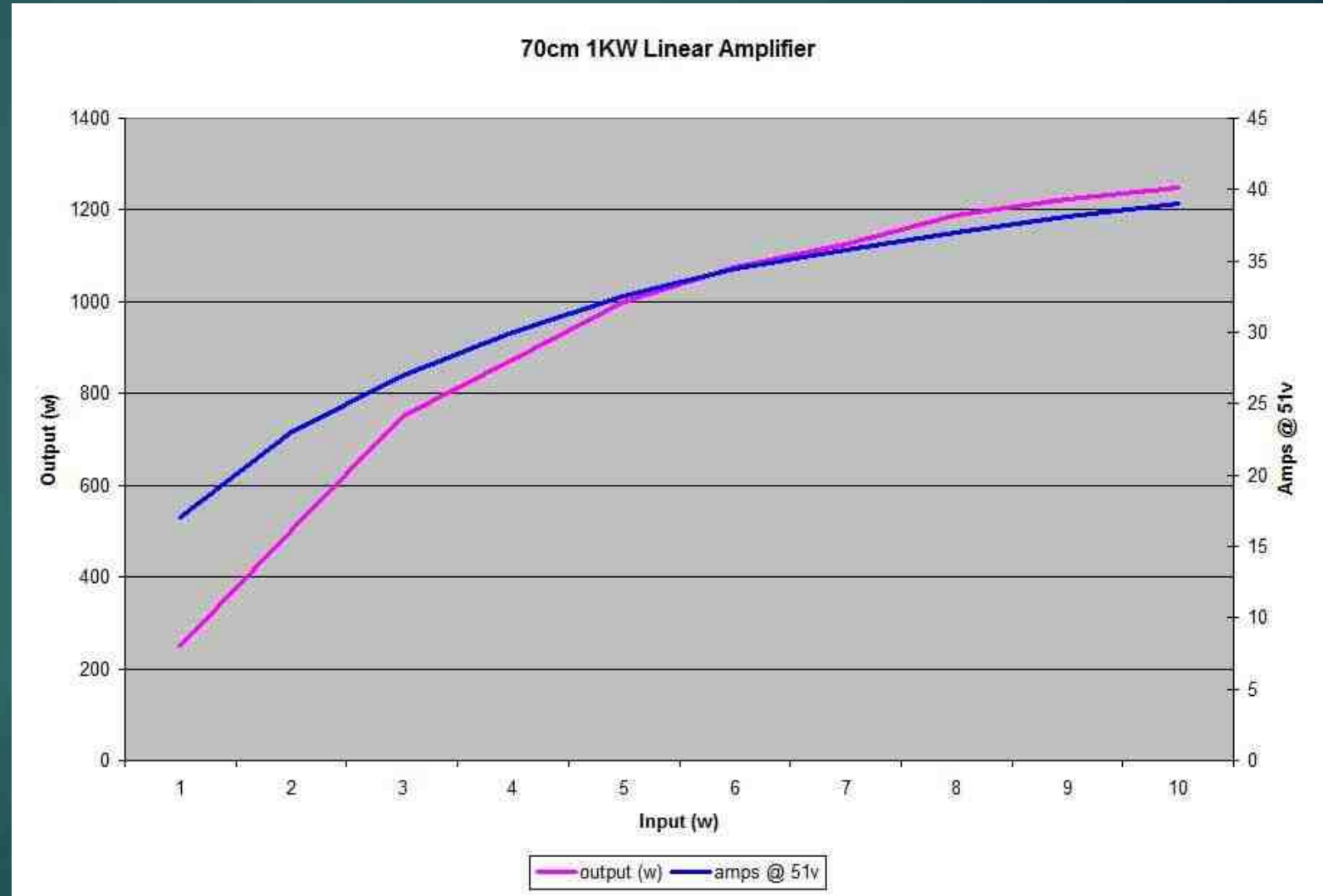
- W6PQL module
- 50V - 45A DC



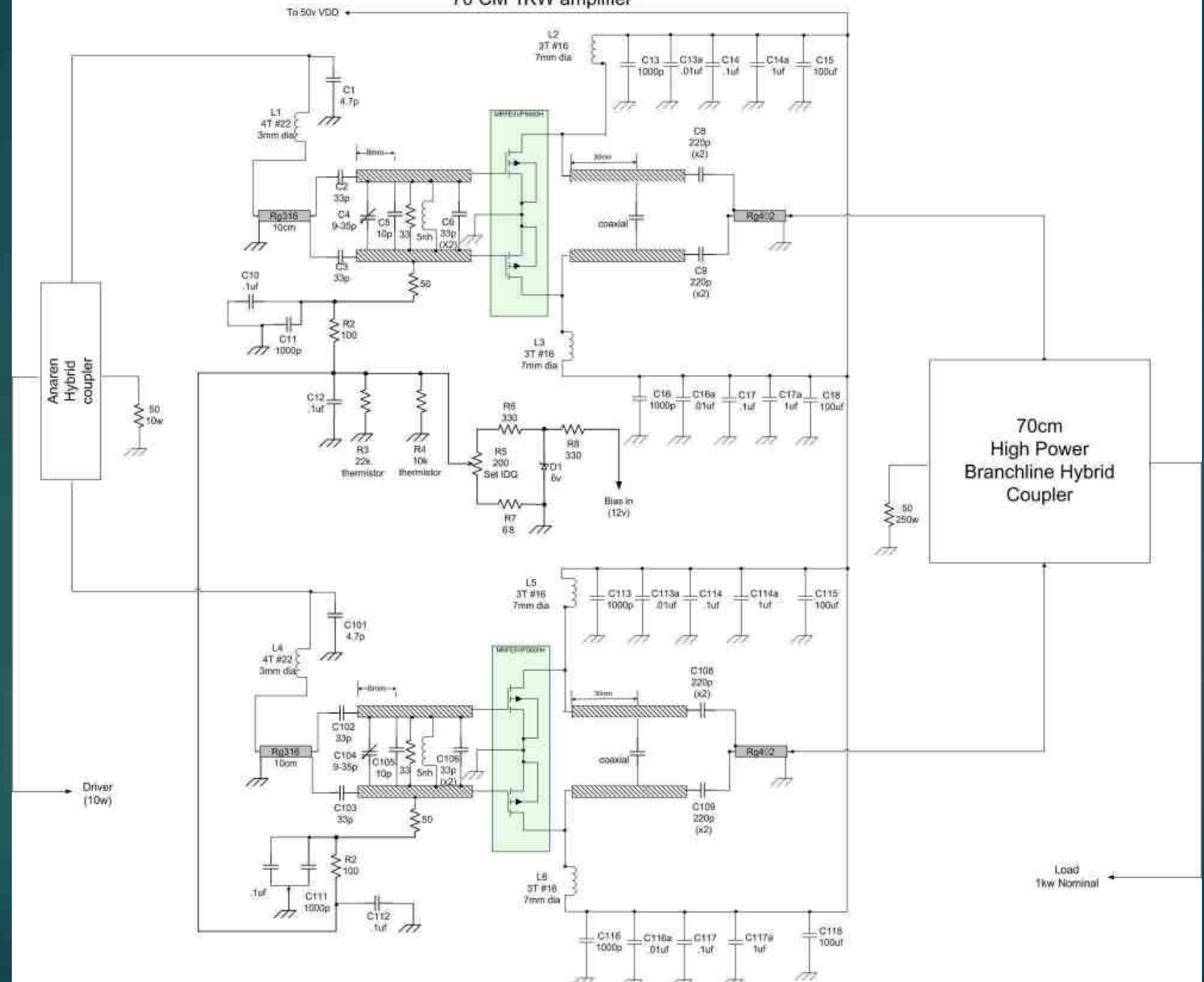
# 432 MHz SSPA

## 1.2kW

- W6PQL module
- 50V - 41A DC
- 1200W out
- 10W and



# 70 CM 1kW amplifier



# Conclusion

Thank you for your attention -  
Questions ?????