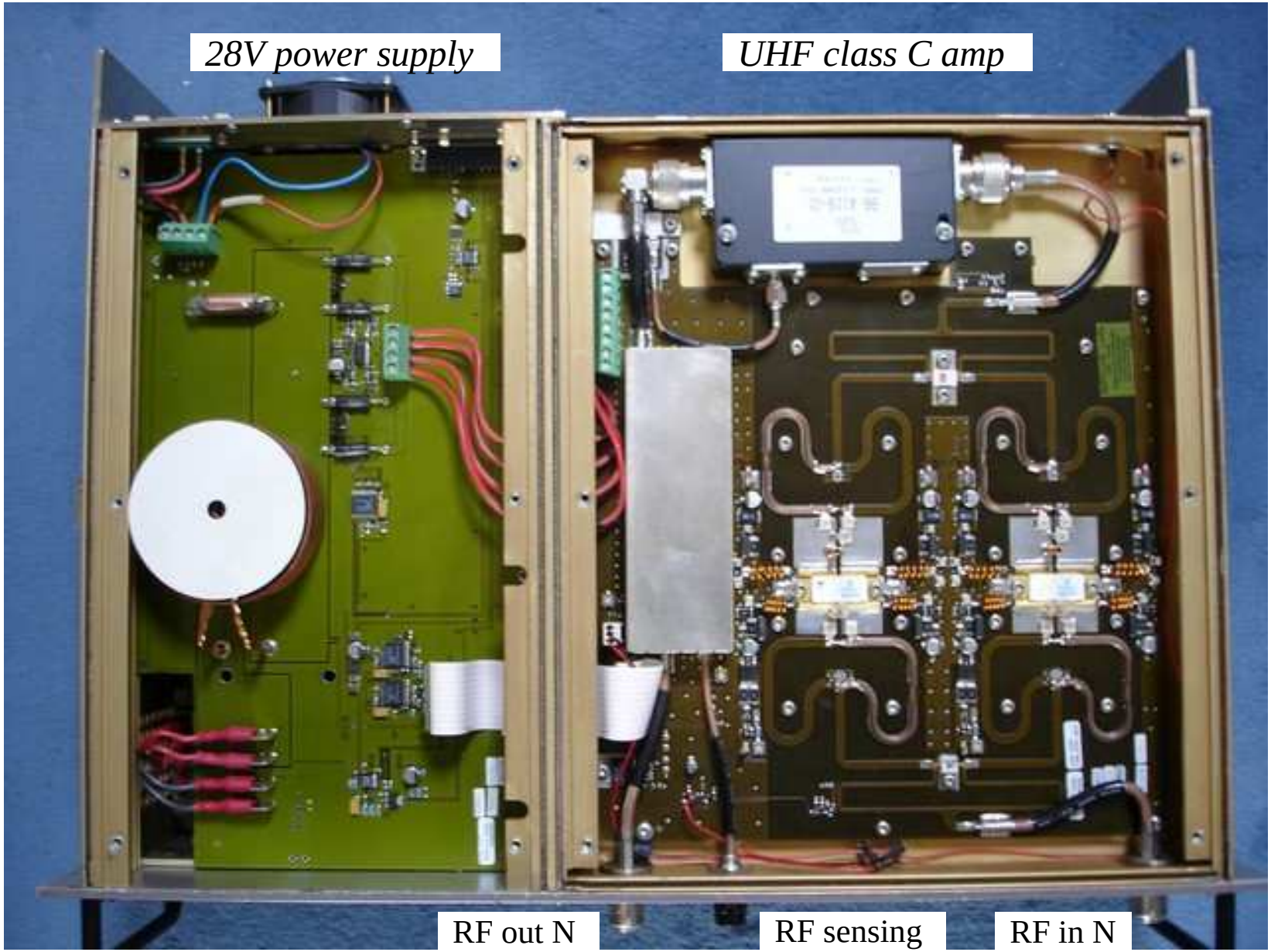
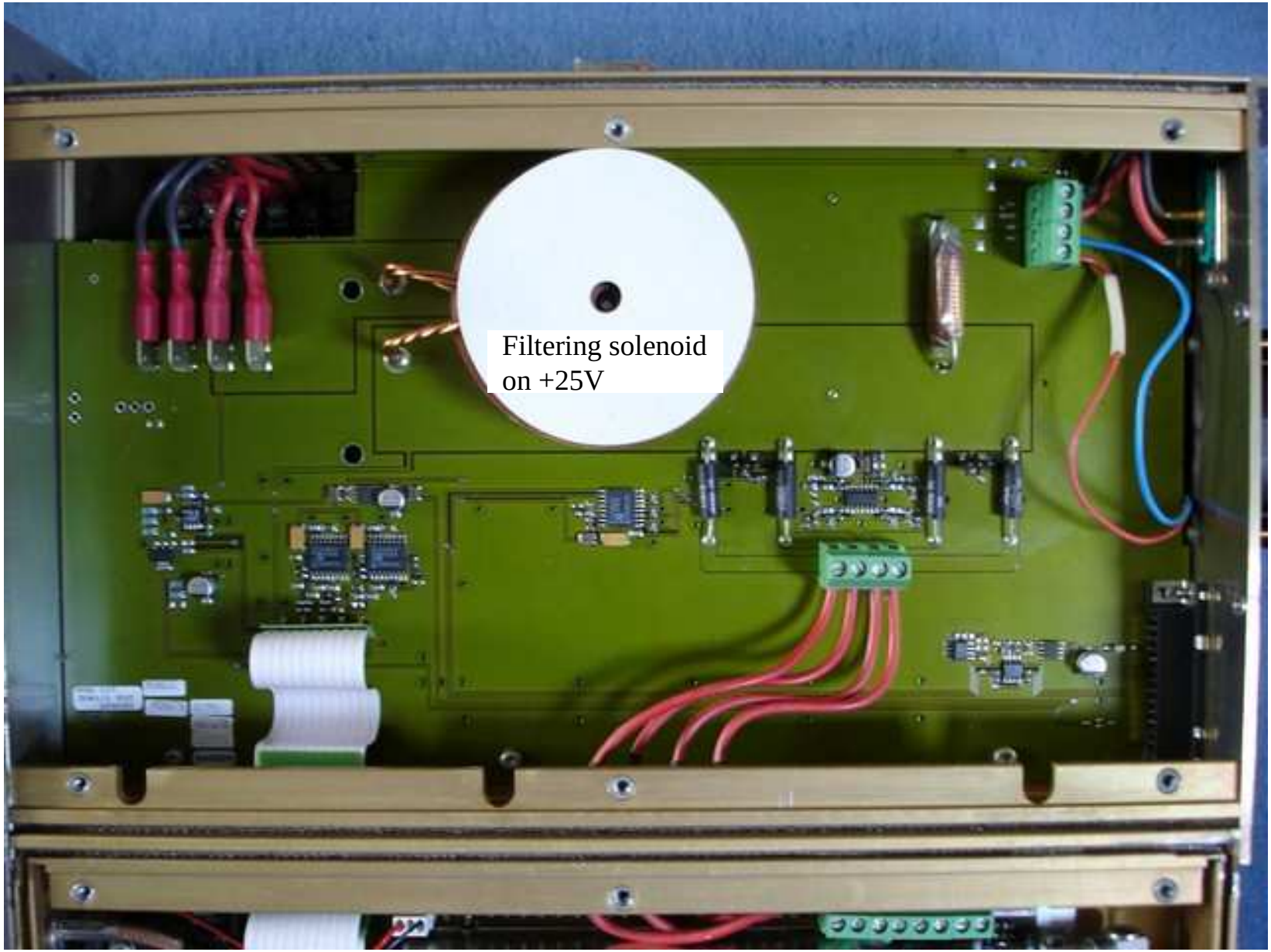
Ericsson Compact 9000 UHF amplifier

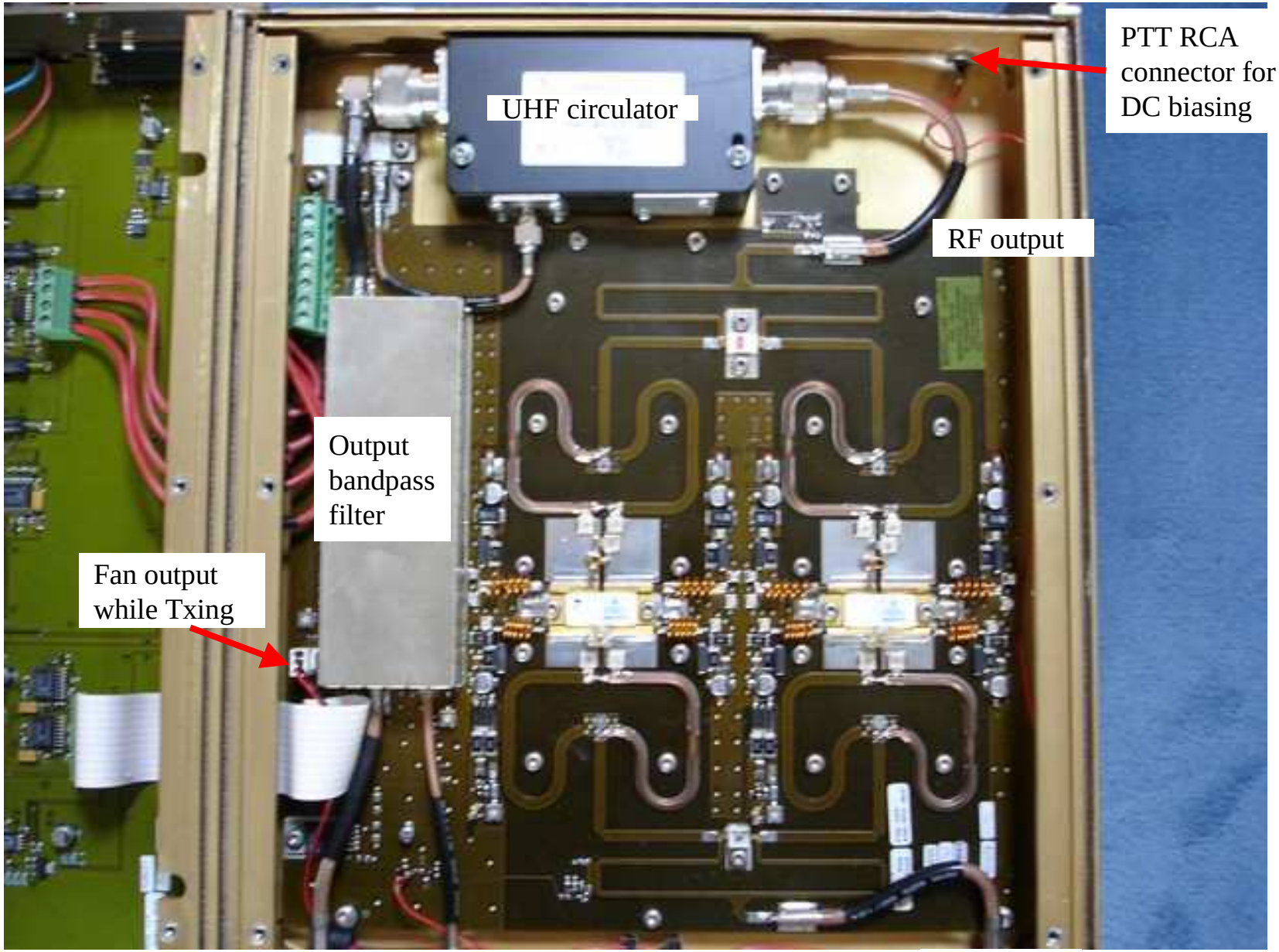
Ericsson Compact 9000 UHF amp: inside initial aspect



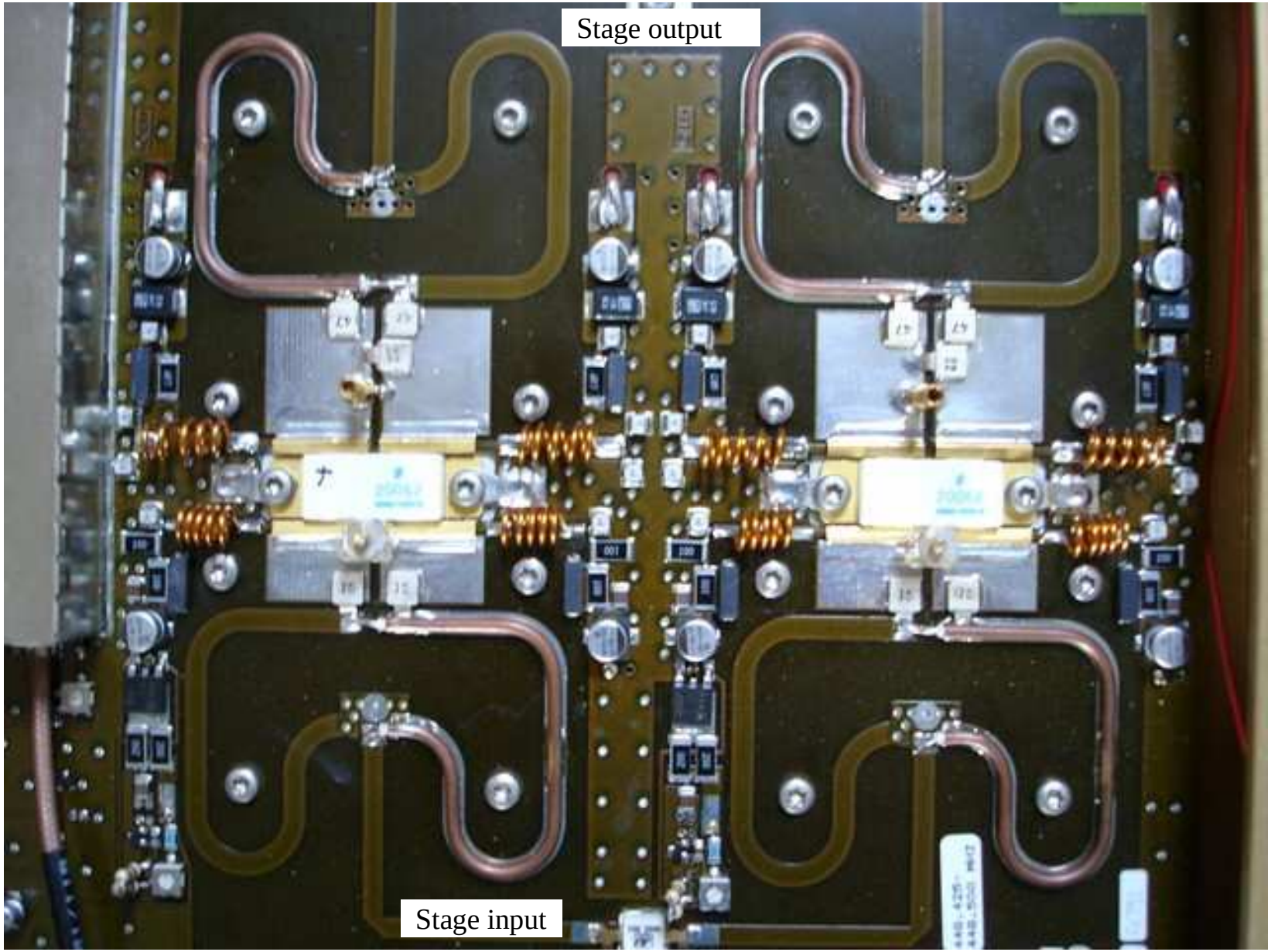
Ericsson Compact 9000 UHF amp: initial power supply



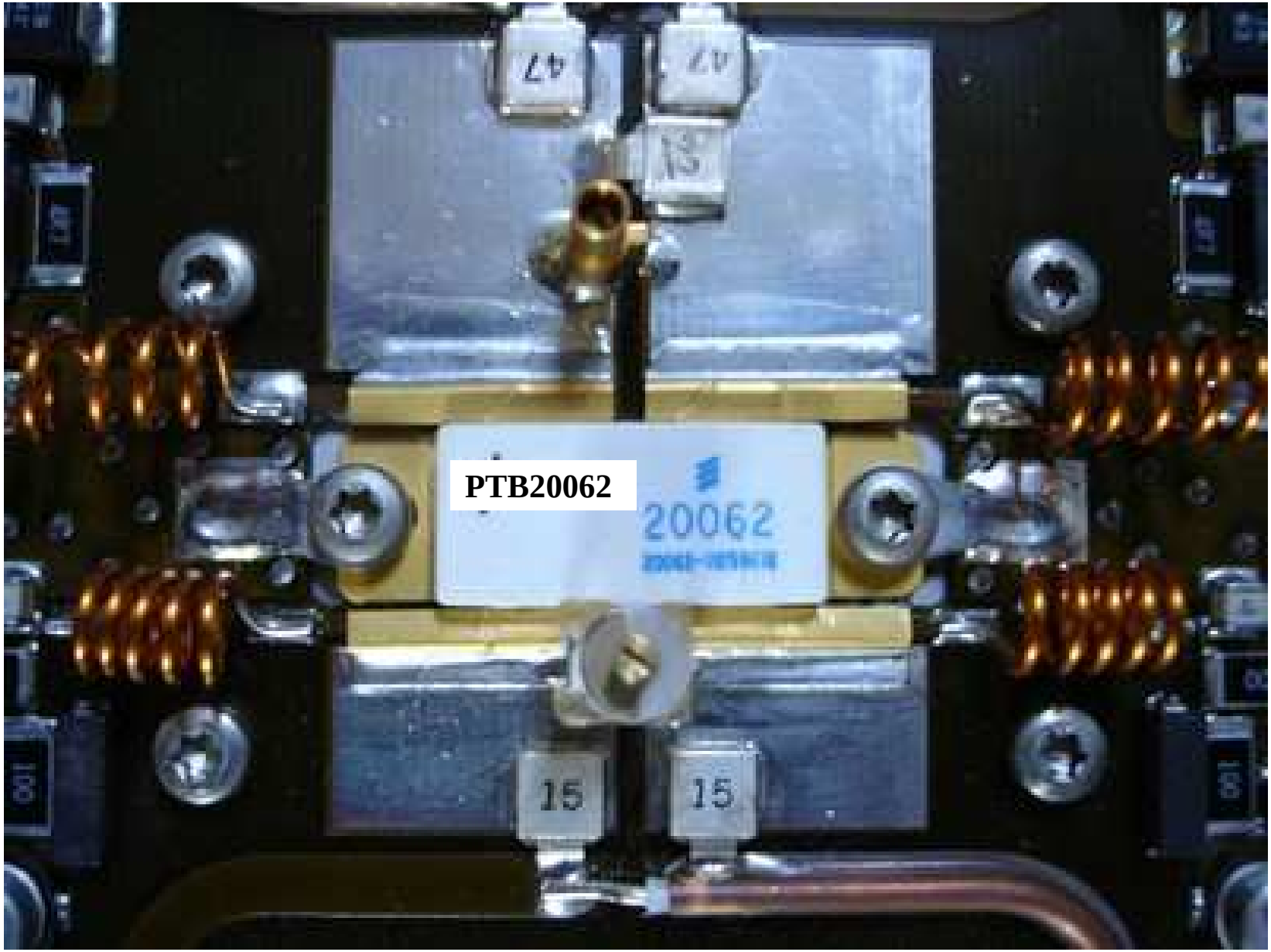
Ericsson Compact 9000: UHF amp part



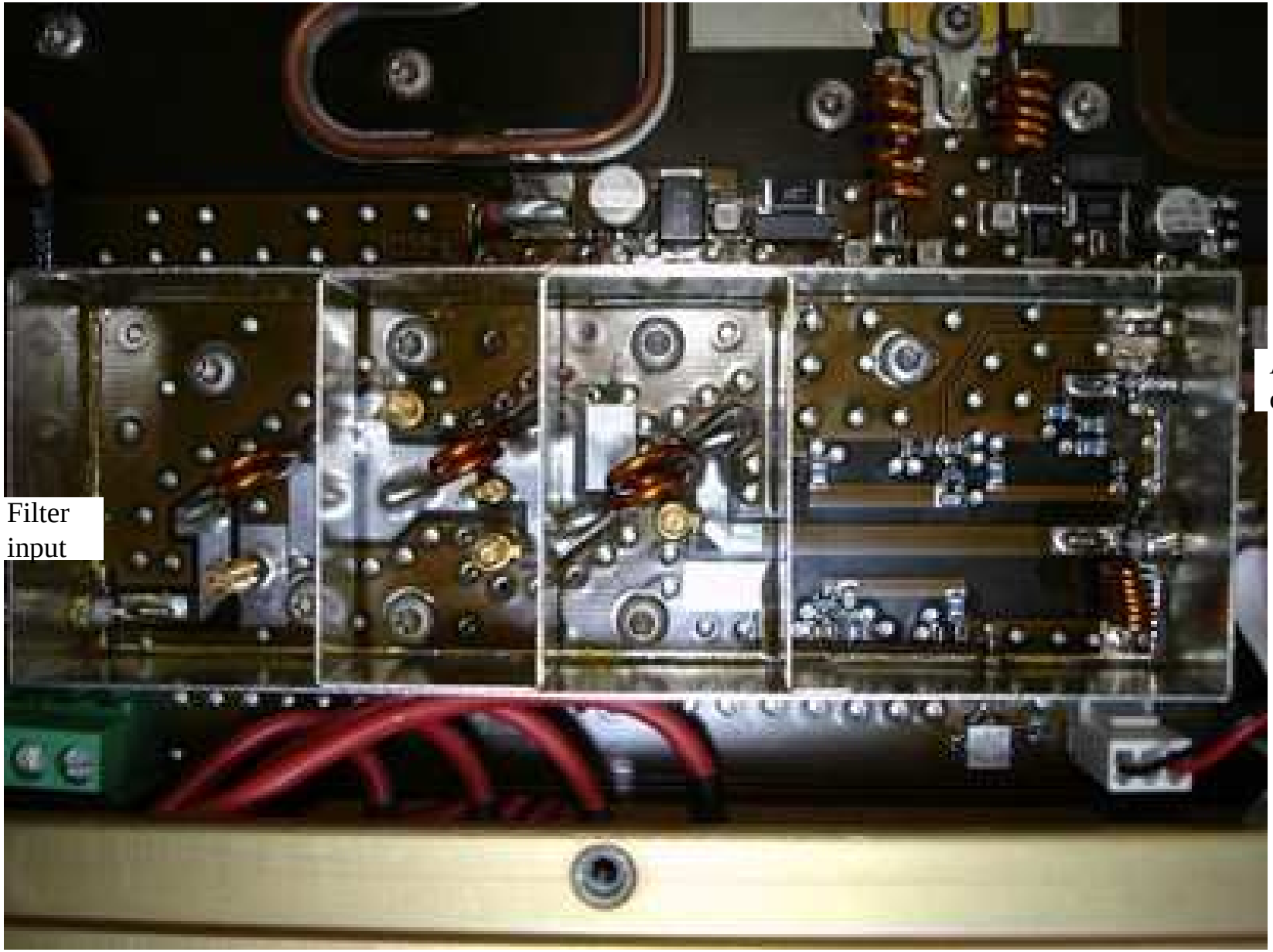
Ericsson Compact 9000 UHF amp: 2 parallel stages



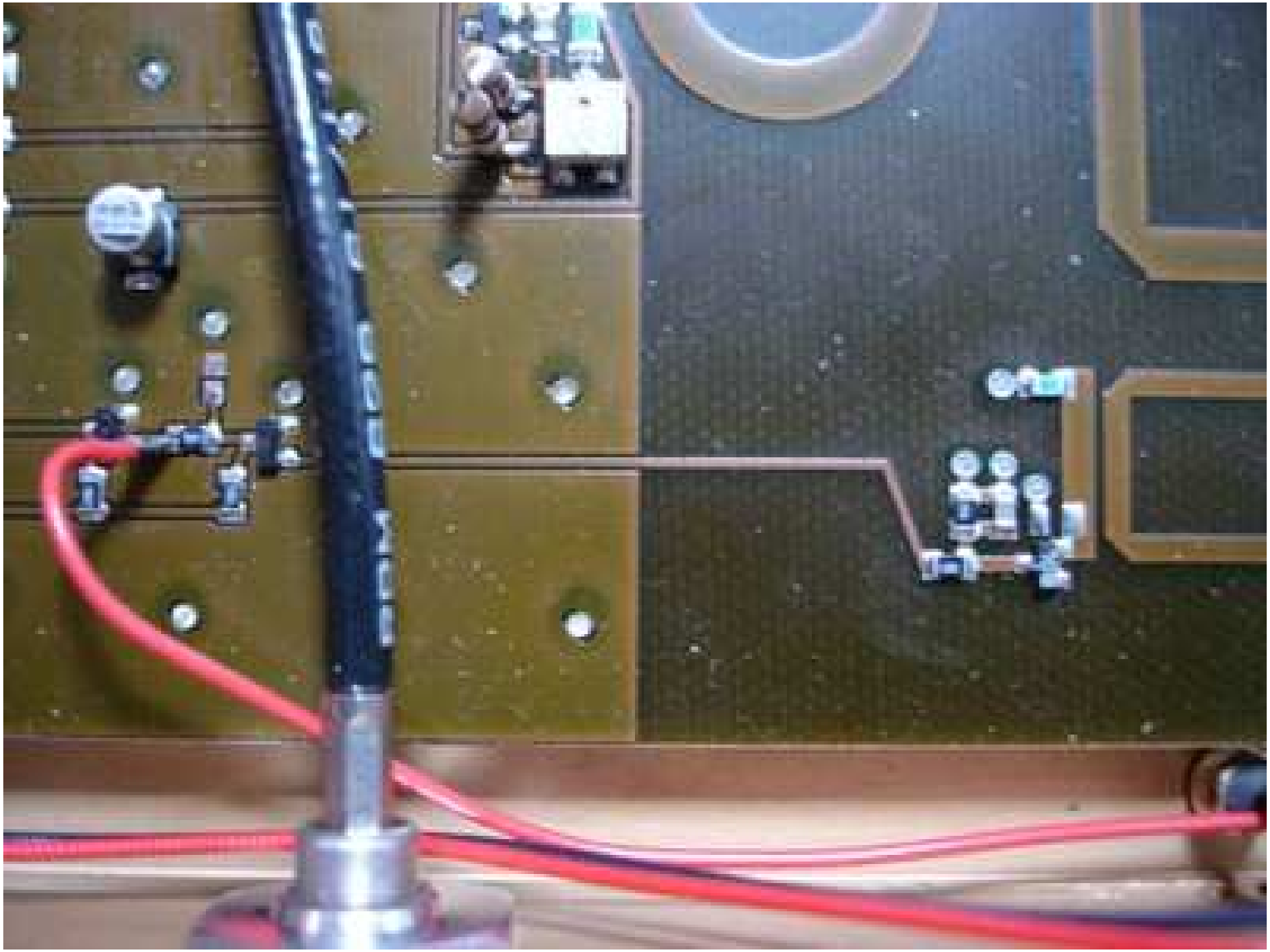
Ericsson Compact 9000 UHF amp: one transistor surrounding



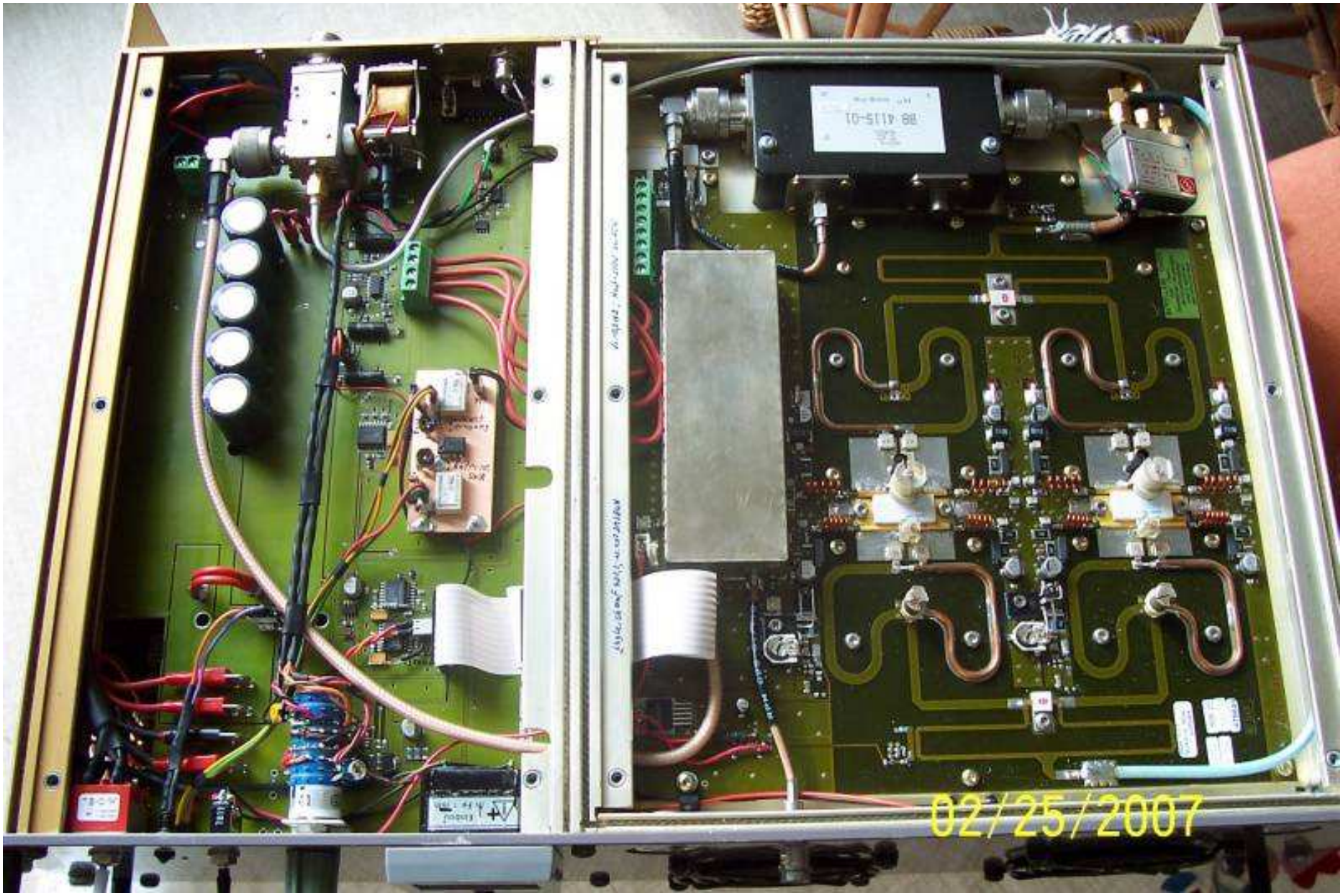
Ericsson Compact 9000 UHF amp: output lowpass filter



Ericsson Compact 9000 UHF amp: PTT wiring for DC bias



Ericsson Compact 9000 UHF amp:



Substitution of original 2 x PTB20062 with 2 x TP3069 (or SD4590)

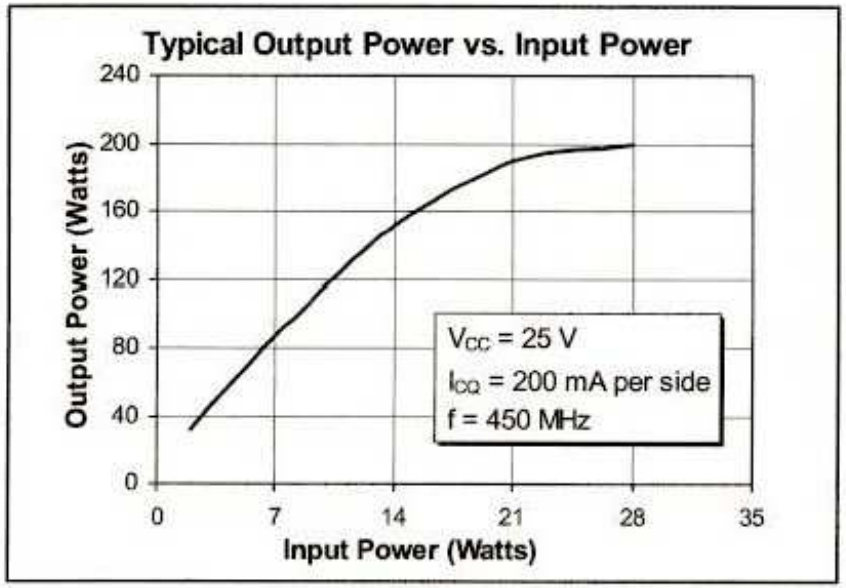
Ericsson Compact 9000 UHF amp : original PTB 20062

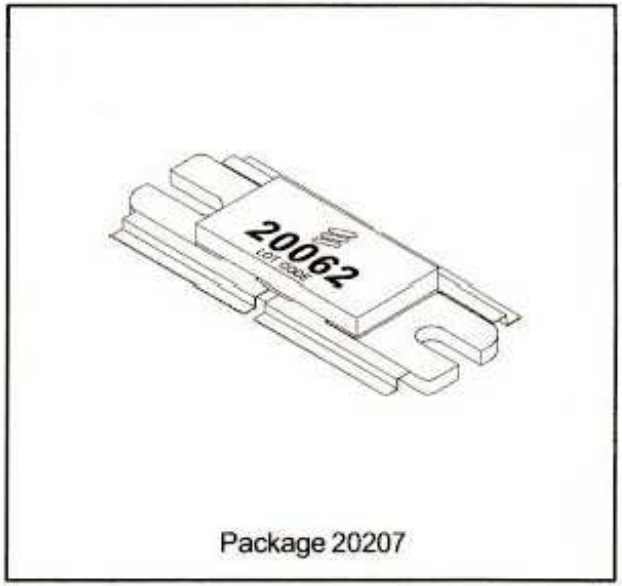
PTB 20062
150 Watts, 450–500 MHz
RF Power Transistor

Description

The 20062 is a class AB, NPN, common emitter RF power transistor intended for 25 Vdc operation from 450 to 500 MHz. Rated at 150 watts minimum output power, it may be used for both CW and PEP applications. Ion implantation, nitride surface passivation and gold metallization are used to ensure excellent device reliability. 100% lot traceability is standard.

- 150 Watts, 450–500 MHz
- Class AB Characteristics
- Gold Metallization
- Silicon Nitride Passivated



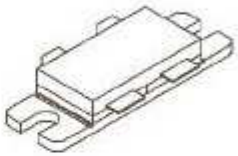


Ericsson Compact 9000 UHF amp : TP3069 or SC4590

SD4590

RF POWER TRANSISTORS
800-960 MHz CELLULAR BASE STATION

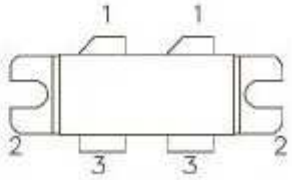
- GOLD METALLIZATION
- DIFFUSED EMITTER BALLASTING
- INTERNAL INPUT/OUTPUT MATCHING
- COMMON EMITTER CONFIGURATION
- DESIGNED FOR LINEAR OPERATION HIGH SATURATED POWER CAPABILITY 26 VOLT, 900 MHz PERFORMANCE
- P_{OUT} =150 W MIN.
  GAIN = 8.5 dB MIN.
  IMD_3 = -28dB MAX. @ P_{OUT} = 150W PEP
- INHERENT RUGGEDNESS:
  LOAD MISMATCH TOLERANCE OF 5:1 MIN. VSWR
  3 dB OVERDRIVE CAPABILITY
- ESD SENSITIVITY, CLASS 3 (MIL STD-883D METHOD 3015)



M208
epoxy sealed

ORDER CODE	BRANDING
SD4590	SD4590

PIN CONNECTION



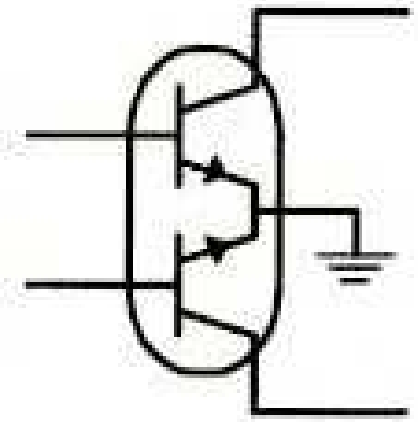
1. Collector
2. Emitter
3. Base

DESCRIPTION

The SD4590 is designed for both analog and digital cellular base stations over the 800 to 960 MHz frequency range, specifically those systems requiring the high linearity and efficiency afforded by class AB operation. Integrated input/output pre-matching simplifies amplifier design. Ruggedness, MTTF, and linearity are enhanced using diffused emitter resistors and refractory/gold metallization.

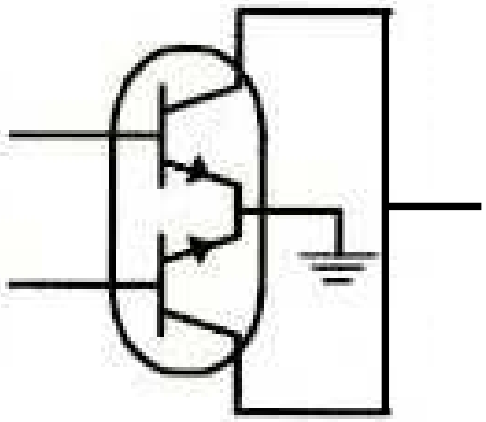
Ericsson Compact 9000 UHF amp now with 2 x TP3069

PTB 20062



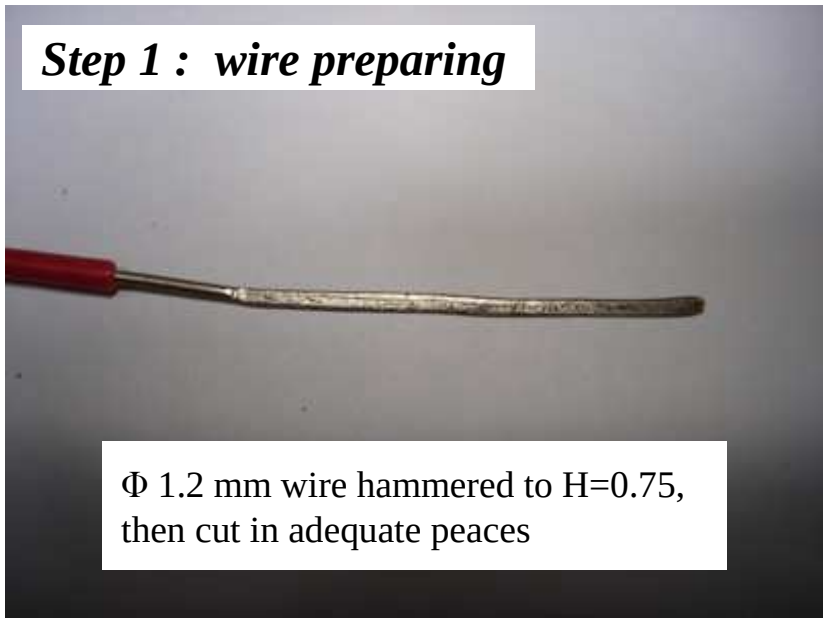
TP3069

(or SD4590 equivalent)

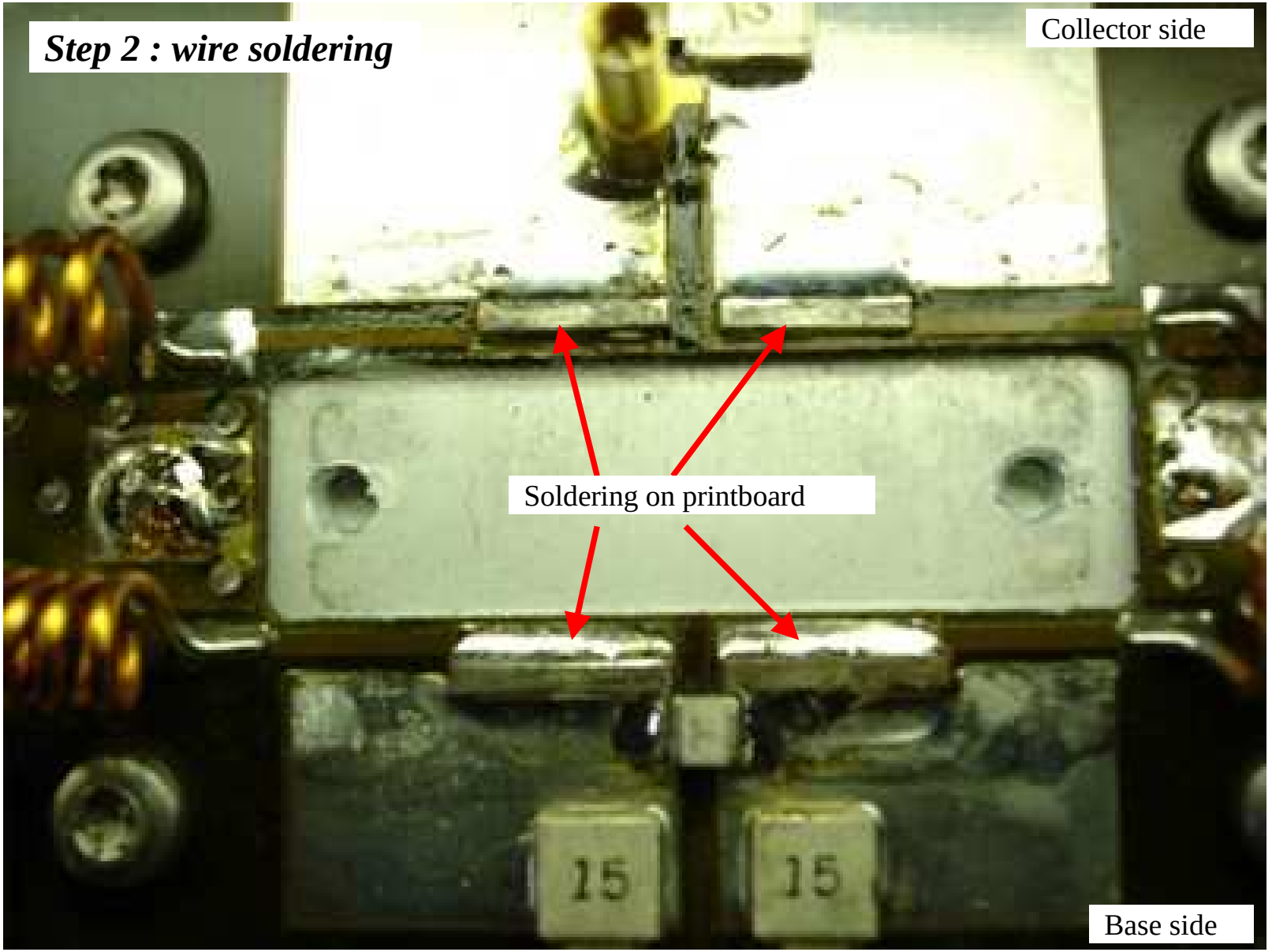


Both collectors DC coupled !!

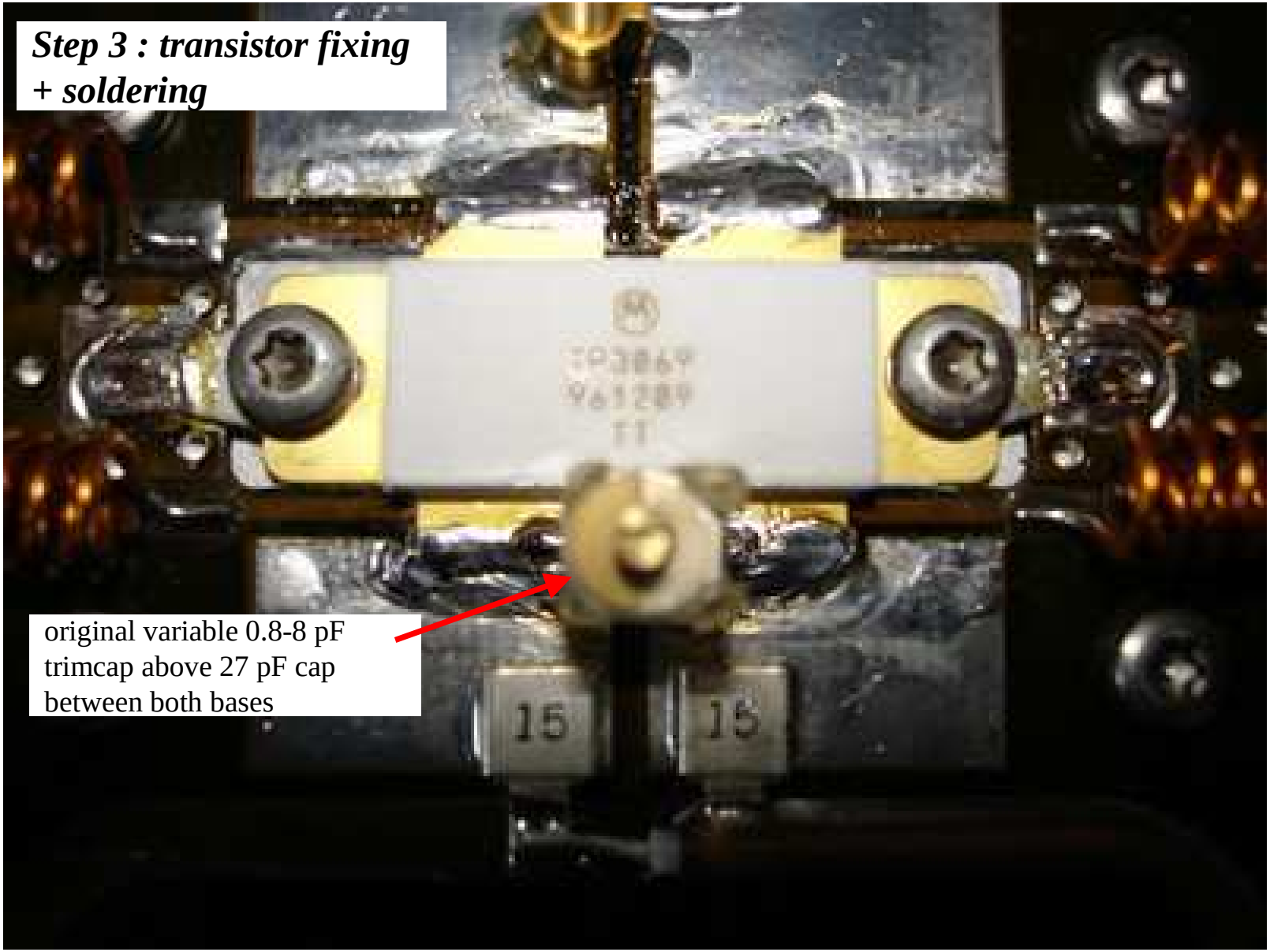
Ericsson Compact 9000 UHF amp now with 2 x TP3069



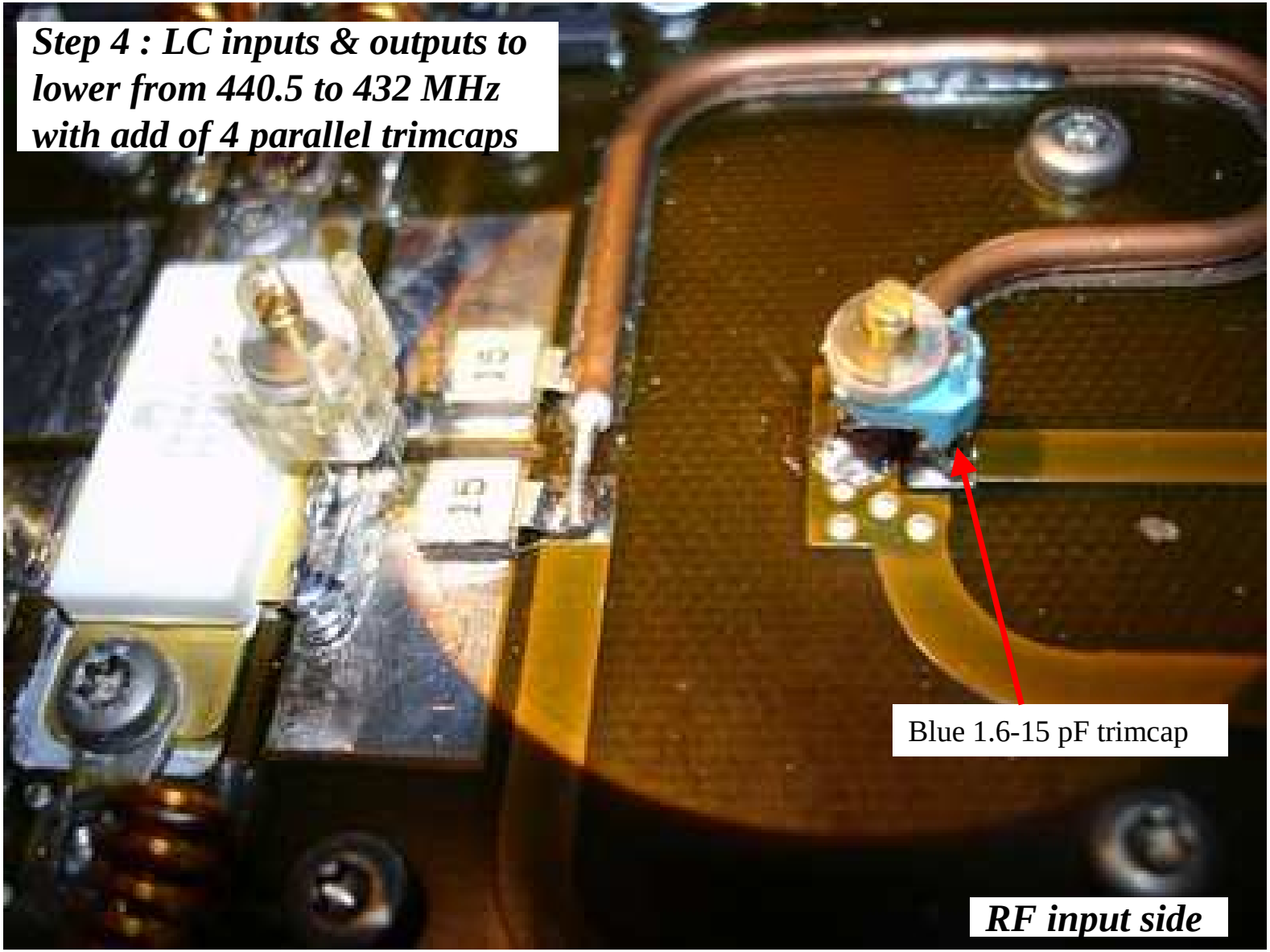
Ericsson Compact 9000 UHF amp now with 2 x TP3069



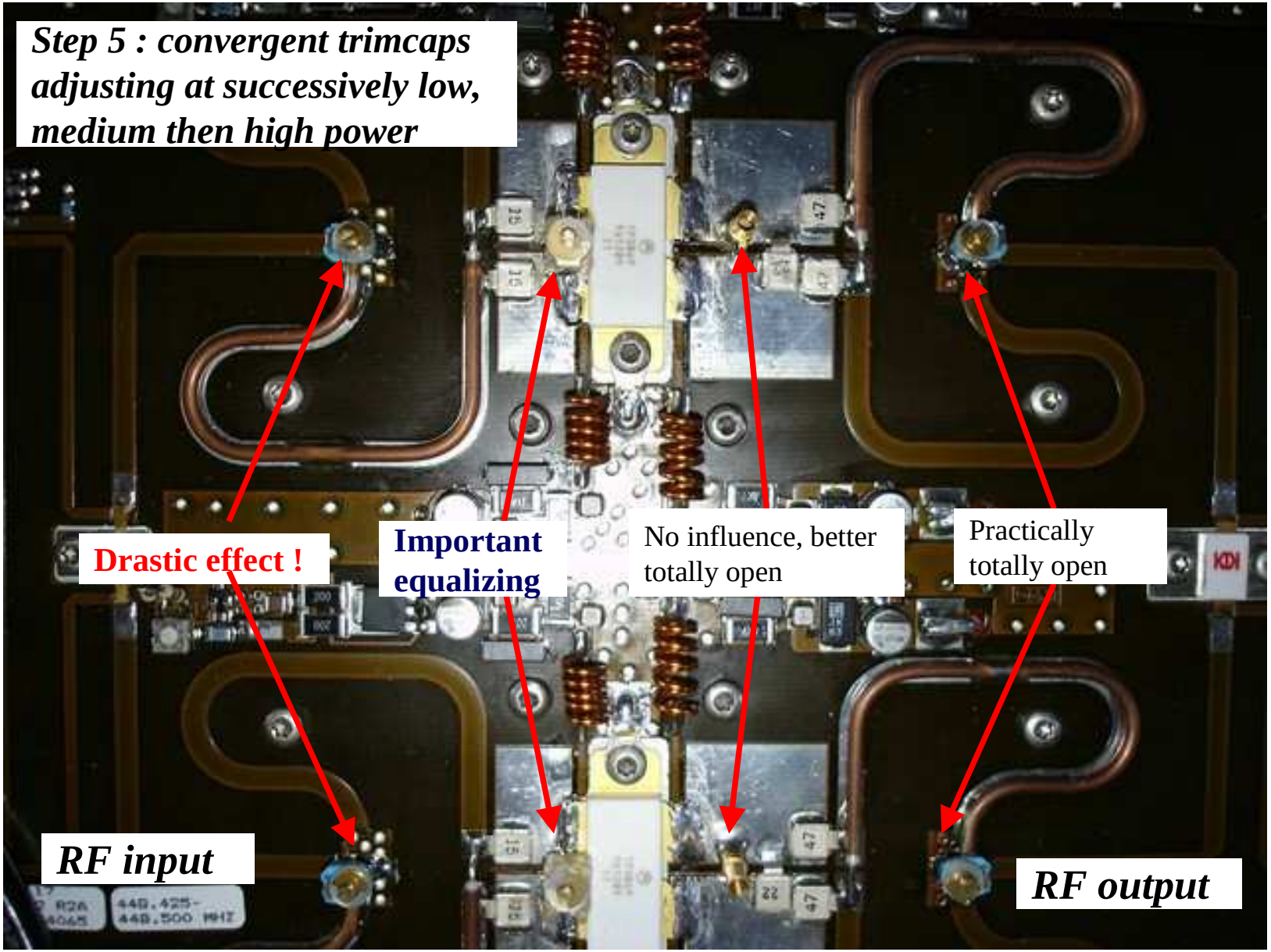
Ericsson Compact 9000 UHF amp now with 2 x TP3069



Ericsson Compact 9000 UHF amp now with 2 x TP3069



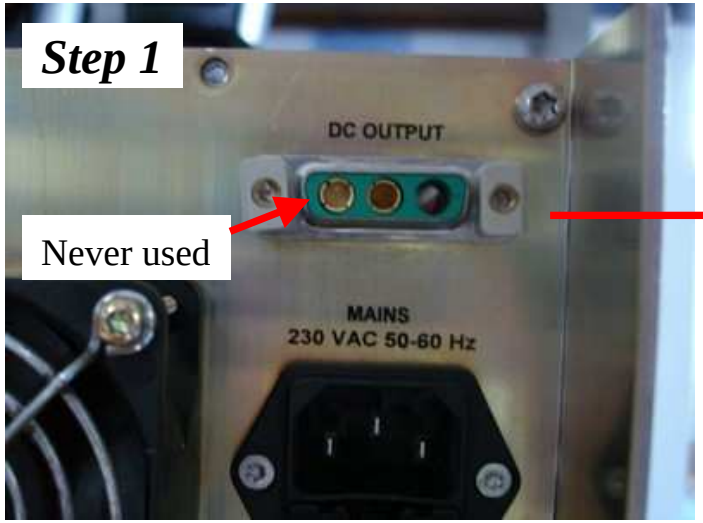
Ericsson Compact 9000 UHF amp now with 2 x TP3069



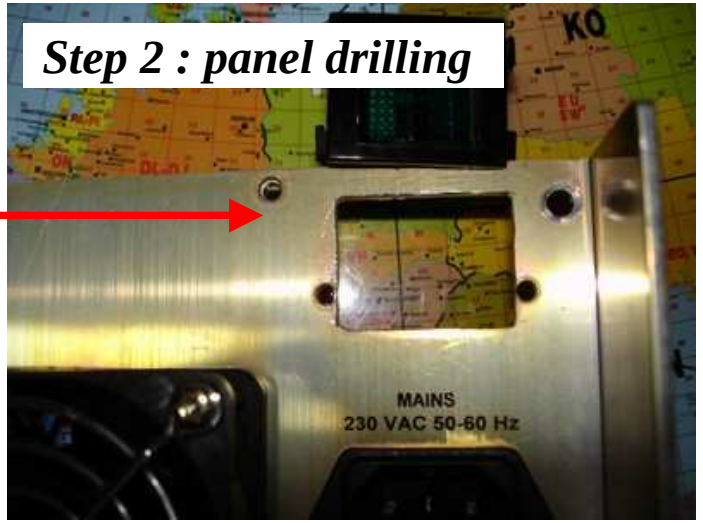
Miscellaneous

Ericsson Compact 9000 UHF amp : on/off switch addition on the rear side

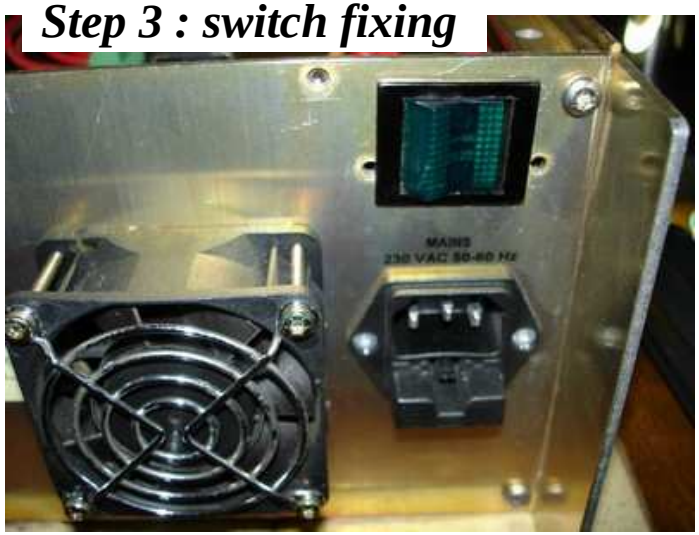
Step 1



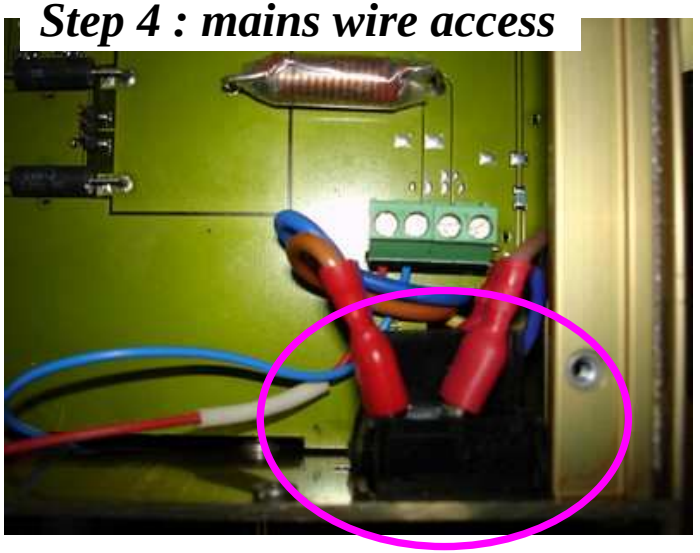
Step 2 : panel drilling



Step 3 : switch fixing



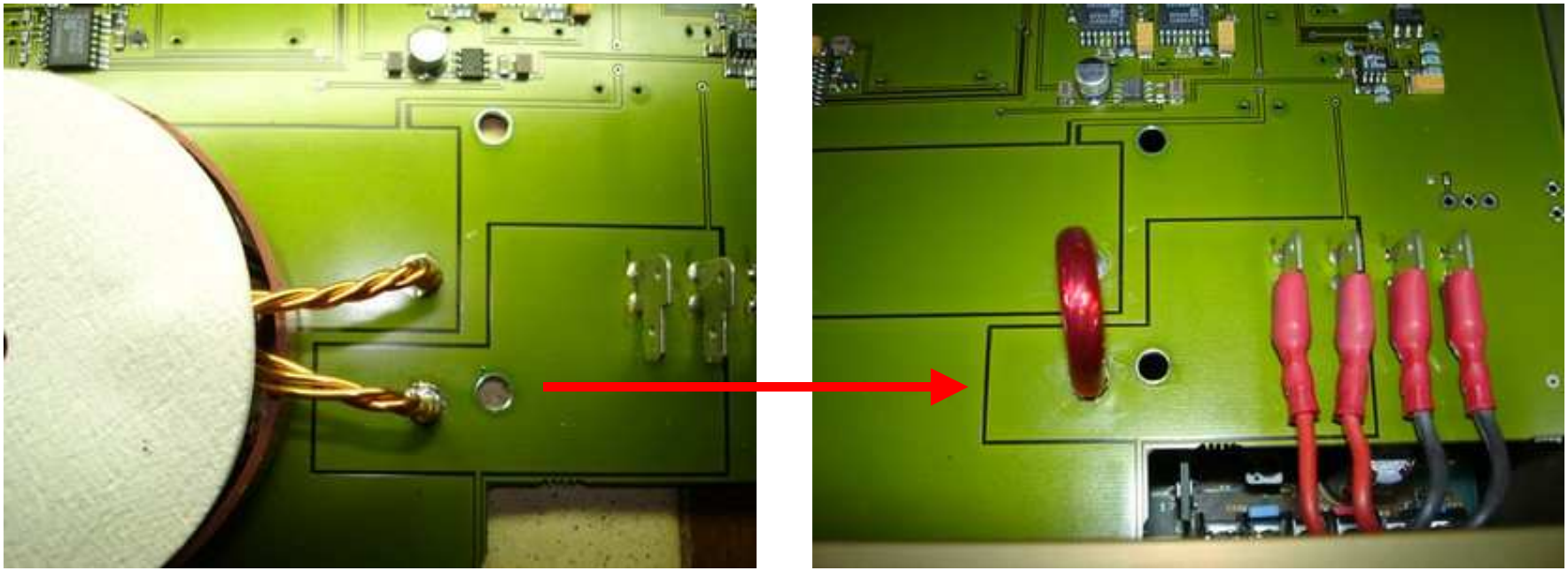
Step 4 : mains wire access



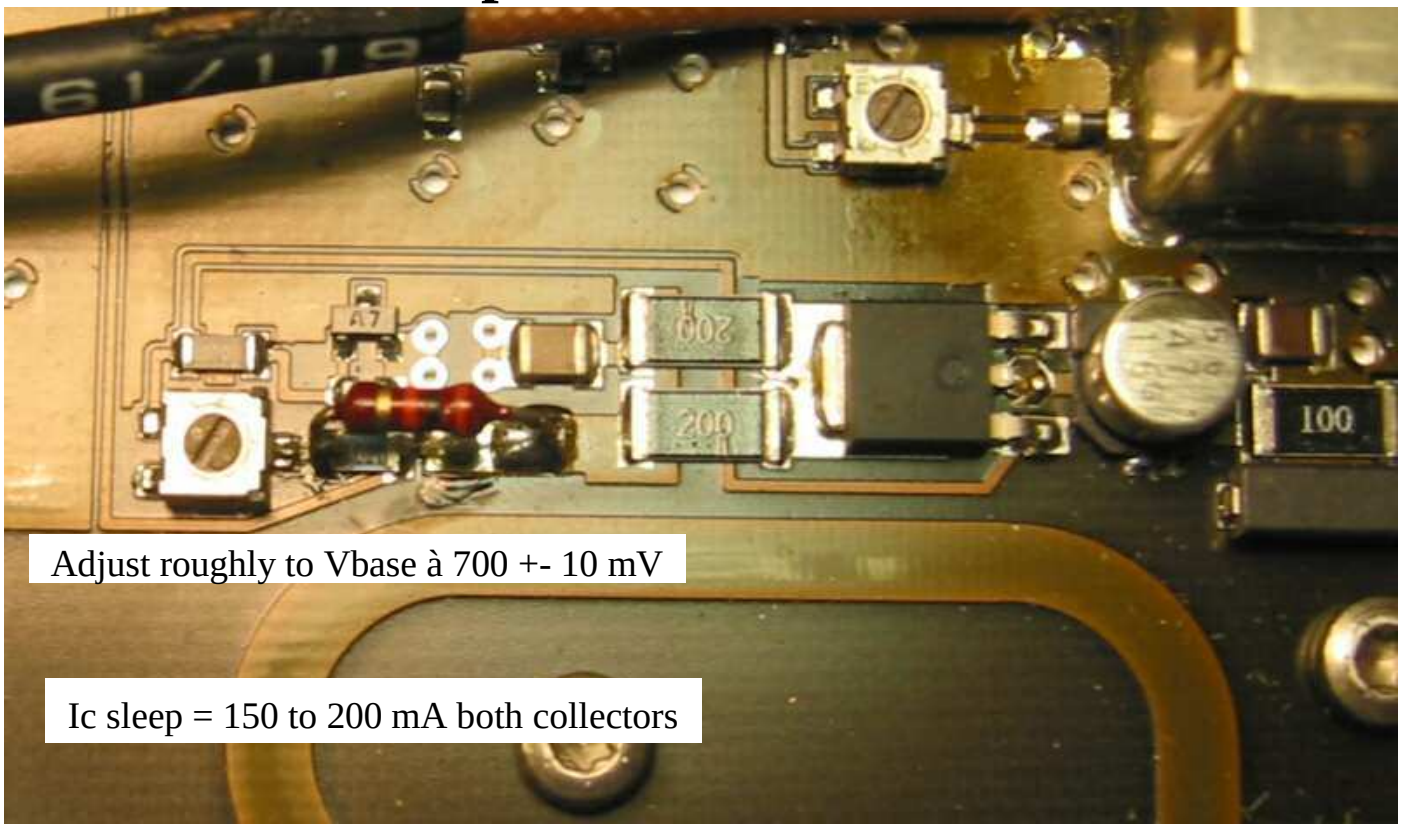
Ericsson Compact 9000 UHF : solenoid take-off

Step 1

Step 2 : strap (avoids problems in SSB that could also destroy the power transistors)

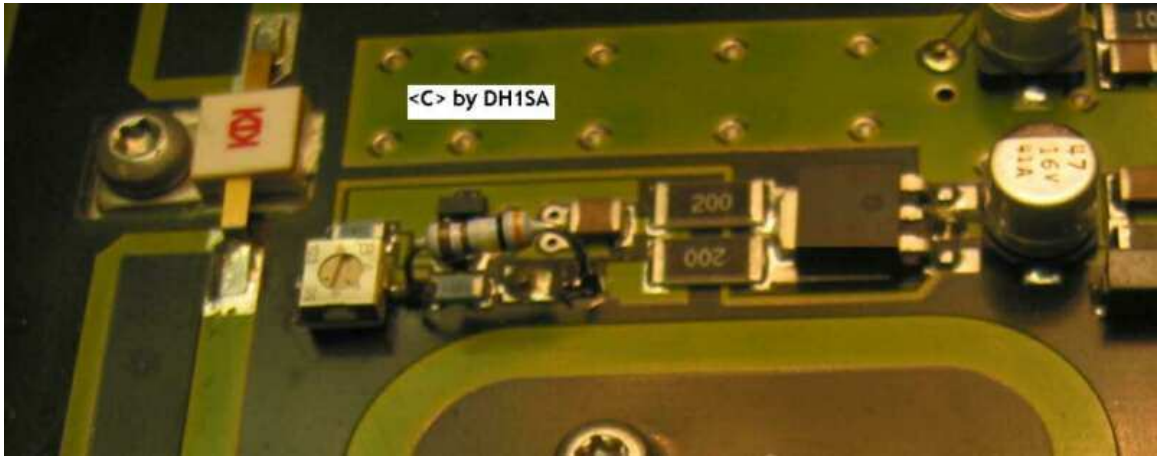


Ericsson Compact 9000 UHF : linearisation



Adjust roughly to Vbase à 700 +- 10 mV

Ic sleep = 150 to 200 mA both collectors



SMA transfer relay adding fitted with RG402 semi rigid hardline

Câbles coaxiaux souples

CARACTERISTIQUES MECANIQUES

NOM	Conducteur extérieur 2	Conducteur extérieur 1 diamètre mm	Diélectrique	Conducteur central diamètre mm		Masse nominale g / m	Rayon de courbure mm	Temp. maximum °C
RG58C - KX15	T1 :CuSn	3.6	PE	2.95	CuSn	19x0.18	38	rayon de courbure minimum * en statique = environ 5 x diamètre ext. du câble * en dynamique= environ 15 x diamètre ..	70
RG142B	T1+T2 :CuAg	4.2	PTFE	2.95	StCuAg	0.95	64		200
RG174A- KX3A	T1 : CuSn	2	PE	1.5	StCu	7x0.16	11		70
RG178B/U	T1 : CuAg	1.3	PTFE	0.83	StCuAg	7x 0.1	8		200
RG188A/U	T1 : CuAg	2	PTFE	1.54	StCuAg	7x 0.18	17		260
RG213U - KX4	T1 : Cu	8.1	PE	7.25	Cu	7x 0.75	153		70
RG214U - KX13	T1+T2 : CuAg	8.7	PE	7.25	Cu	7x 0.75	183		70
RG217U - KX14	T1+T2 : Cu	11.2	PE	9.4	Cu	2.68	301		70
RG223U	T1+T2 : CuAg	4.2	PE	2.95	CuAg	0.89	55		70
RG225U - KX24	T1+T2 : CuAg	8.7	PTFE	7.25	CuAg	7x 0.79	64		260
RG316U	T1 : CuAg	2	PTFE	1.54	StCuAg	7x 0.18	16		200
RG393U	T1+T2 : CuAg	8.7	PTFE	7.25	CuAg	7x 0.78	230		200
RG400U	T1+T2 : CuAg	4.2	PTFE	2.95	CuAg	19x 0.2	63		200
X94	F1:Ag ; T2:CuAg	(3.79)	PTFE	----	CuAg	0.91	40	sta :20	200
X97	F1:Ag ; T2:CuAg	(5.9)	PTFE	----	CuAg	1.63	82	sta :32	200
X98	F1:Ag ; T2:CuAg	(7.4)	PTFE	----	CuAg	2.24	113	sta :45	200
421-011	T1:CuAg ; F2: Al	(3.18)	PTFE	----	CuAg	----	26	sta :12.7	150
421-010	T1:CuAg ; F2: Al	(5.33)	PTFE	----	CuAg	----	66	sta :25.4	150
421-014	T1:CuAg ; F2: Al	(7.37)	PTFE	----	CuAg	----	118	sta :38.1	150
Sucoflex 102-50	F1+T2 : CuAg	(3.5)	PTFE	----	CuAg	----	34	sta :11	200
Sucoflex 103	F1+T2 : CuAg	(4.4)	PTFE	----	CuAg	----	53	sta :13	165
Sucoflex 106	F1+T2 : CuAg	(7.9)	PTFE	----	CuAg	----	157	sta :24	165
Utiflex UFA125A	F1+T2 : CuAg	(3.18)	PTFE	----	CuAg	----	26	5.08	165
Utiflex UFB142A	F1+T2 : CuAg	(3.61)	PTFE	----	CuAg	----	33	9.65	165
Utiflex UFB205A	F1+T2 : CuAg	(5.25)	PTFE	----	CuAg	----	66	12.7	165

PE = polyéthylène plein ; PTFE = teflon
conducteur extérieur : T = tresse , F = feuille ou ruban
(x,xx) = conducteur extérieur + gaine

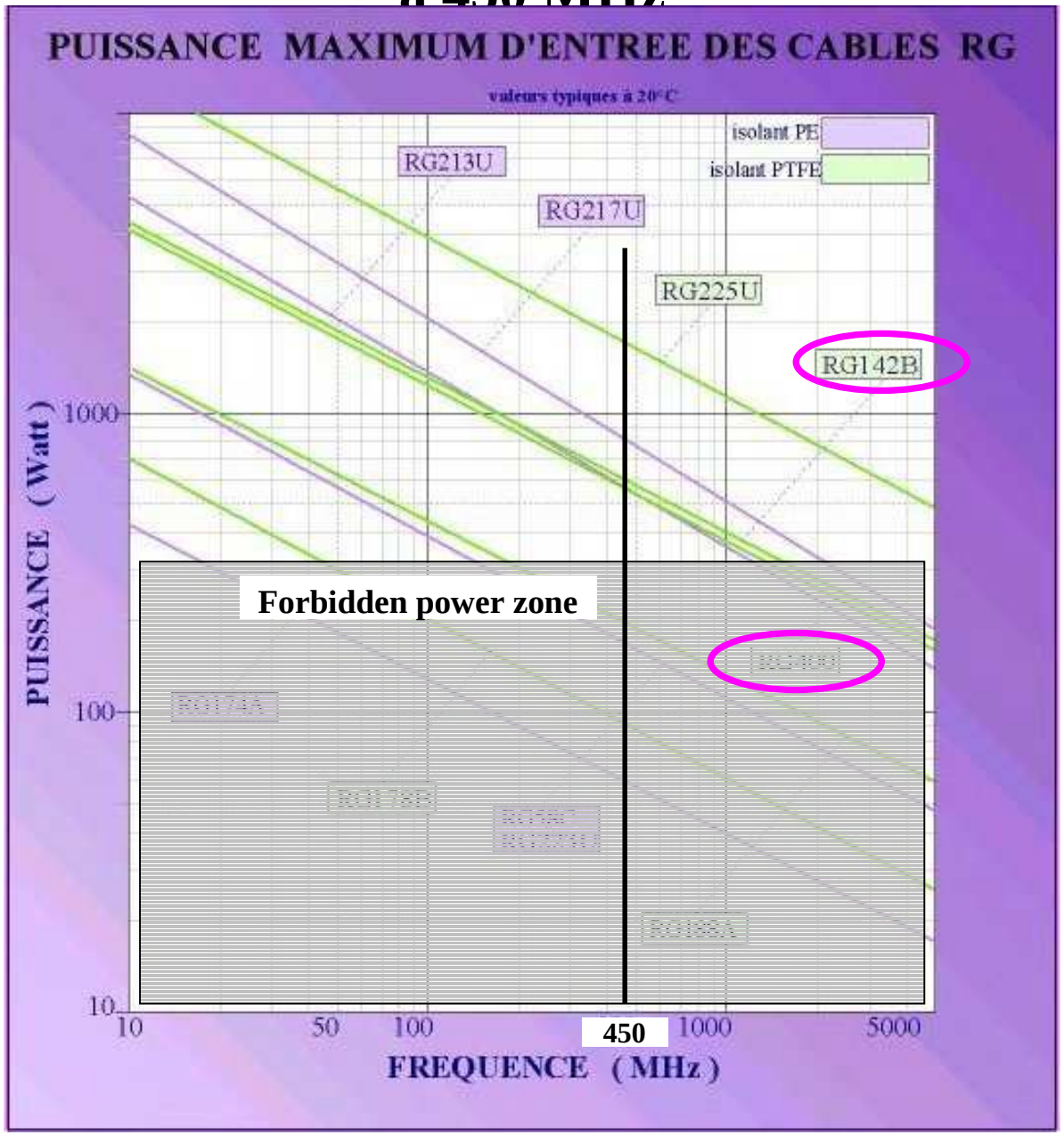
Câbles coaxiaux souples

CARACTERISTIQUES ELECTRIQUES

NOM	Fréquence de coupure GHz	Rigidité diélectrique V (eff)	Vitesse de propagation %	Capacité pF/m	Retard linéique ns /m	Puissance moyenne à 5 GHz Watts	Pertes à 5 GHz dB / m
RG58C - KX15	3	1900	66	101	5	110*	0.56*
RG142B	8	1900	71	96.4	4.7	160	0.11
RG174A- KX3A	3	1500	66	101	5	40*	0.93*
RG178B/U	3	1000	71	96.4	4.7	48*	1.5*
RG188A/U	3	1200	71	96.8	4.7	125*	0.91*
RG213U - KX4	11	5000	66	101	5	185*	0.3*
RG214U - KX13	11	5000	66	101	5	180*	0.42*
RG217U - KX14	3	6000	66	101	5	600*	0.2*
RG223U	12.4	2500	66	101	5	50*	0.7*
RG225U - KX24	11	5000	69	96	4.9	1200*	0.26*
RG316U	12.4	1200	71	96.4	4.7	60	2.1
RG393U	12	5000	71	96.4	4.7	500	0.68
RG400U	12.4	1900	71	93.4	4.7	150	1.24
X94	46	1500	84	79	3.94	-----	0.8
X97	26.5	1500	84	79	3.94	-----	0.46
X98	19.5	1500	84	79	3.94	-----	0.33
421-011	40	2500	74	90.2	4.53	100	1.21
421-010	27.5	6000	75	88.6	4.46	260	0.59
421-014	19.8	7500	76	87.9	4.39	520	0.43
Sucoflex 102-50	51	500	78	85	4.3	-----	1
Sucoflex 103	33	2000	77	87	4.3	<300	0.7
Sucoflex 106	18	3800	77	87	4.3	700	0.36
Utiflex UFA125A	50	-----	77	86	----	-----	1.61**
Utiflex UFB142A	40	-----	83	80.4	----	-----	1.08**
Utiflex UFB205A	26.5	-----	83	80.4	----	-----	0.92**

* = valeurs à 1 GHz ** = valeurs à 10 GHz

Ericsson Compact 9000 UHF : max power of semi-rigid cables à 450 MHz



Diam 3.58 et 2.18

Ericsson Compact 9000 UHF : max power of semi-rigid cables à 432 MHz

Cable	Power 144MHz	Power 432MHz	Power 1296MHz
RG58C	240W	100W	50W
RG213	800W	430W	200W
RG214	650W	340W	175W
RG223	400W	200W	100W
RG402/UT141	2000W	1000W	550W
Belden 9913	1065W	603W	342W
Belden 9913F7	935W	533W	304W
LMR400	1500W	830W	470W
LMR400UF	1000W	550W	310W
FSJ4-50B	2490W	1380W	770W
LDF4-50A	2750W	1530W	860W
LDF5-50A	6040W	3320W	1810W

Ericsson Compact 9000 UHF : max power of RG402 & 405 hardlines à 450 MHz

NOMINAL LOSS CHARACTERISTICS (DB/100 FEET):

FREQ (MHZ)	CABLE REFERENCE (SEE BELOW)															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	HP
10	0.86	0.41	1.35	1.2	1.1	0.9	0.9	1.2	3.8	3.8	—	0.04	—	—	—	—
50	1.50	1.00	3.0	3.1	2.3	1.9	2.1	2.7	6.5	7.9	—	0.09	—	—	—	—
100	2.20	1.4	4.3	4.8	3.3	2.8	3.0	3.9	8.9	11.5	2.00	0.13	5.90	3.25	3.8	—
200	3.20	2.1	6.0	7.0	4.7	3.7	4.3	5.5	12	15	2.75	0.18	8.20	4.60	5.3	—
400	4.60	3.1	8.8	10.0	6.7	5.2	6.1	8.0	17.5	20	4.15	0.28	10.15	6.65	7.5	—
1000	9.0	5.8	16.5	17.5	11.5	8.5	10.5	13.0	31	30	8.5	0.51	19.0	11.0	12.0	—
3000	19.0	13.0	36.0	38.0	25.5	18.4	23.5	26.0	64.3	58	13.0	—	34.0	20.5	25.0	—
5000	28.0	19.0	51.0	—	41.0	29.5	36.0	36.0	97	79	17.5	—	44.0	28.0	29.5	—
10000	47.0	31.0	85.0	—	—	—	—	62.0	185	133	27.0	—	67.0	43.0	42.0	—

AVERAGE POWER HANDLING CAPABILITY, WATTS CW, EXCEPT WHERE NOTED
(@ AMBIENT OF 40° C, SEA LEVEL. CENTER CONDUCTOR @ 80° C FOR POLYETHYLANE, 200° C FOR PTFE).

10	3700	6000	800	730	1300	1300	1150	9000	170	1250	—	130 KW	—	—	—	—
50	1300	2000	310	280	480	480	420	3500	72	600	—	53KW	—	—	—	—
100	850	1200	205	180	310	310	280	2400	50	450	850	37 KW	350	1100	2.4KW	—
200	540	800	137	125	200	200	180	1600	36	330	550	24 KW	240	760	1.5 KW	—
400	350	480	90	85	135	135	120	1100	25	240	360	17KW	165	520	1KW	—
1000	190	260	53	50	77	77	69	650	16	160	210	9.2KW	95	310	570	—
3000	95	120	28	25	40	40	35	350	—	80	115	—	50	160	290	—
5000	65	85	20	—	27	27	25	245	—	57	85	—	36	120	220	—
10000	37	50	10	—	—	—	—	140	—	30	60	—	26	76	150	—

CABLE REFERENCE FINDER (TYPE RG/U OR OTHER):

GROUP	CABLE(S)
A*	9, 9A, 9B, 11, 12, 13, 214, 216
B	14, 74, 217, 224, 293, 338
C	55, 55A, 55B, 223
D	58, 58B
E	59, 59A, 59B
F	62, 62A, 71, 71A
G	62B
H	140, 141, 141A, 142, 142B, 159, 302

GROUP	CABLE(S)
I	174, 174A
J	188, 188A, 316
K	SF214
L	234, 242
M	0.086 SEMIRIGID, SNAKE, ULTRA-FLEX, RG405
N	0.141 SEMIRIGID, SNAKE, ULTRA-FLEX, RG402
O	SF142B
HP	HIGH PERFORMANCE TO 26 GHZ, SEE DATA SHEETS FOR 8301, 8165, 8190, 8290, 8305, 8305S, 8305SP

* 10000 MHZ DATA NOT APPLICABLE TO RG11, 12, 13, 216

Cables

Nominal Loss & Power Handling Characteristics

MIDISCO

RG402 Φ3.59 ou 0.141"

RG405 Φ2.18 ou 0.085"

Ericsson Compact 9000 UHF : semi-rigid hardline dims

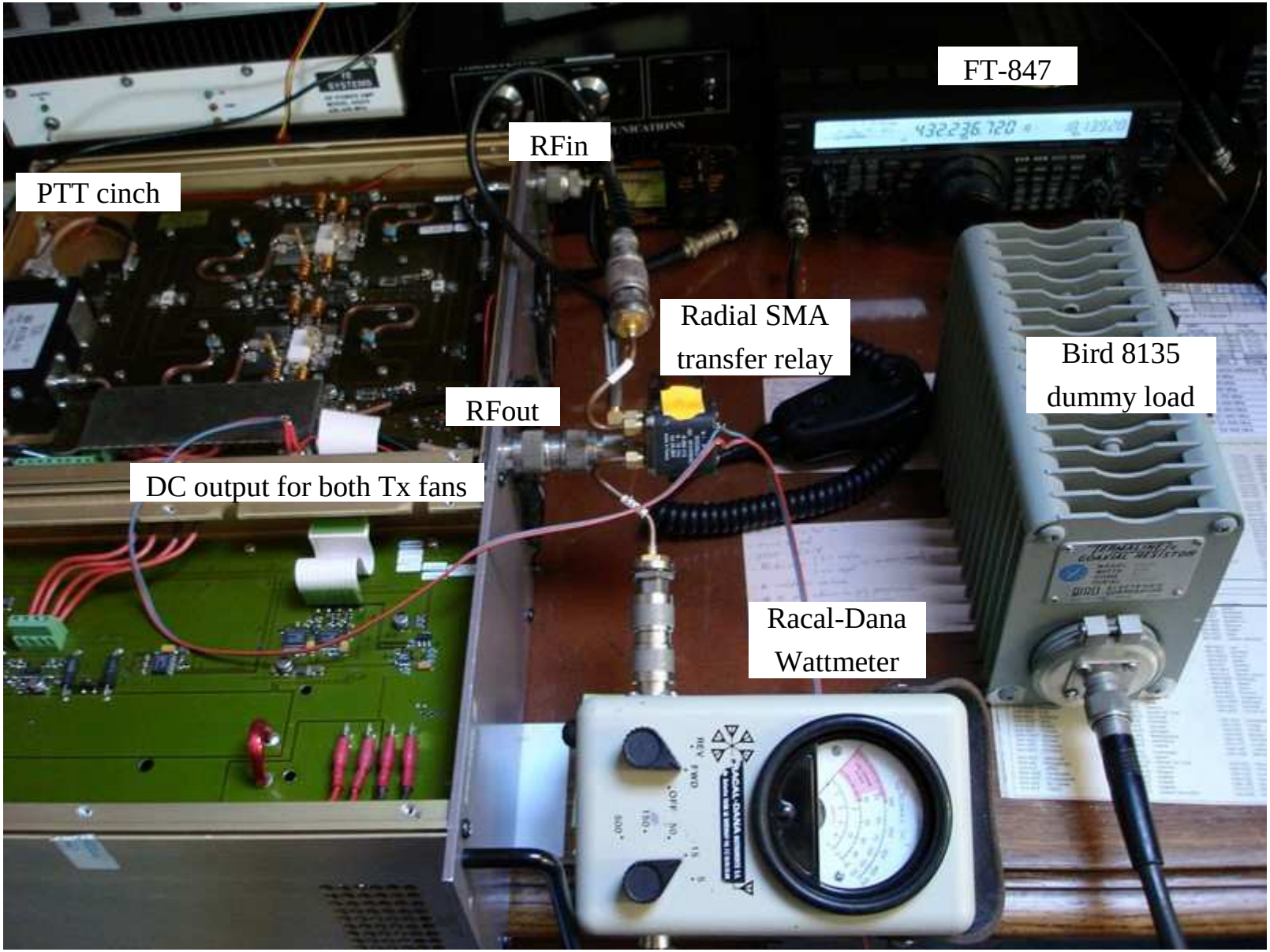
CARACTERISTIQUES MECANIQUES

NOM	Conducteur extérieur		Diélectrique		Conducteur central		Masse nominale	Rayon de courbure	Temp. maximum
		mm		mm		mm	g / m	mm	°C
UT390	Cu	9.91	PTFE	8.43	CuAg	2.59	332	19	90
421-202	Al	12.7	TM		CuAg	3.89	284	—	200
UT325	Cu	8.26	PTFE	7.24	CuAg	7x0.79	220	19	90
421-227	Al	9.52	TM		CuAg	2.97	160	—	200
RG401,KS3	Cu	6.35	"	5.31	CuAg	1.63	152	9.5	200
X42	Cu	6.35	"		CuAg	1.65	150	10	175
EZ250,UT250	Cu	6.35	PTFE	5.31	"	1.63	147	9.5	100
421-336	Cu	6.35	TM		"	1.88	137	5.1	200
421-673	Cu	6.35	TM		"	1.29	66	—	200
X61	CuSn	3.1	"		"	0.5	29	3	165
RG402,KS2	Cu	3.58	PTFE	2.98	StCuAg	0.92	51.5	6.35	175
X38	CuSn	3.6	"		"	0.9	50	6	150
EZ141,UT141	Cu	3.58	"	2.95	"	0.91	48	4.8	125
421-298	Cu	3.58	TM		CuAg	1.09	41	2.6	200
RG405,KS1	Cu	2.2	PTFE	1.68	StCuAg	0.515	22.9	3.18	175
X62	CuSn	2.2	"		"	0.5	20	3	125
X63	AlSn	2.2	"		StCuAg	0.5	10.5	3	125
EZ86,UT85	Cu	2.2	PTFE	1.68	"	0.51	20	1.3	125
421-069	Cu	2.95	TM		CuAg	0.81	33	1.8	200
421-193	Cu	2.18	TM		CuAg	0.51	22	1.52	200
EZ86AL	Al	2.19	PTFE	1.68	StCuAg	0.51	11	3.25	125
UT70	Cu	1.78	PTFE	1.5	CuAg	0.45	11.5	3.2	125
X60	CuSn	1.2	"		StCuAg	0.3	6	3	105
EZ47,UT47	Cu	1.19	PTFE	0.94	StCuAg	0.287	5.7	1.3	150
EZ34,UT34	Cu	0.86	"	0.66	StCuAg	0.203	3.1	1.3	125
UT20	Cu	0.58	"	0.42	"	0.13	1.6	1.27	125
UT13	Cu	0.33	"	0.25	"	0.08	0.4	1.27	125
UT8	Cu	0.2	"	0.1	Cu	0.05	0.3	0.8	150

TM = teflon microporeux St = acier

Output power measures

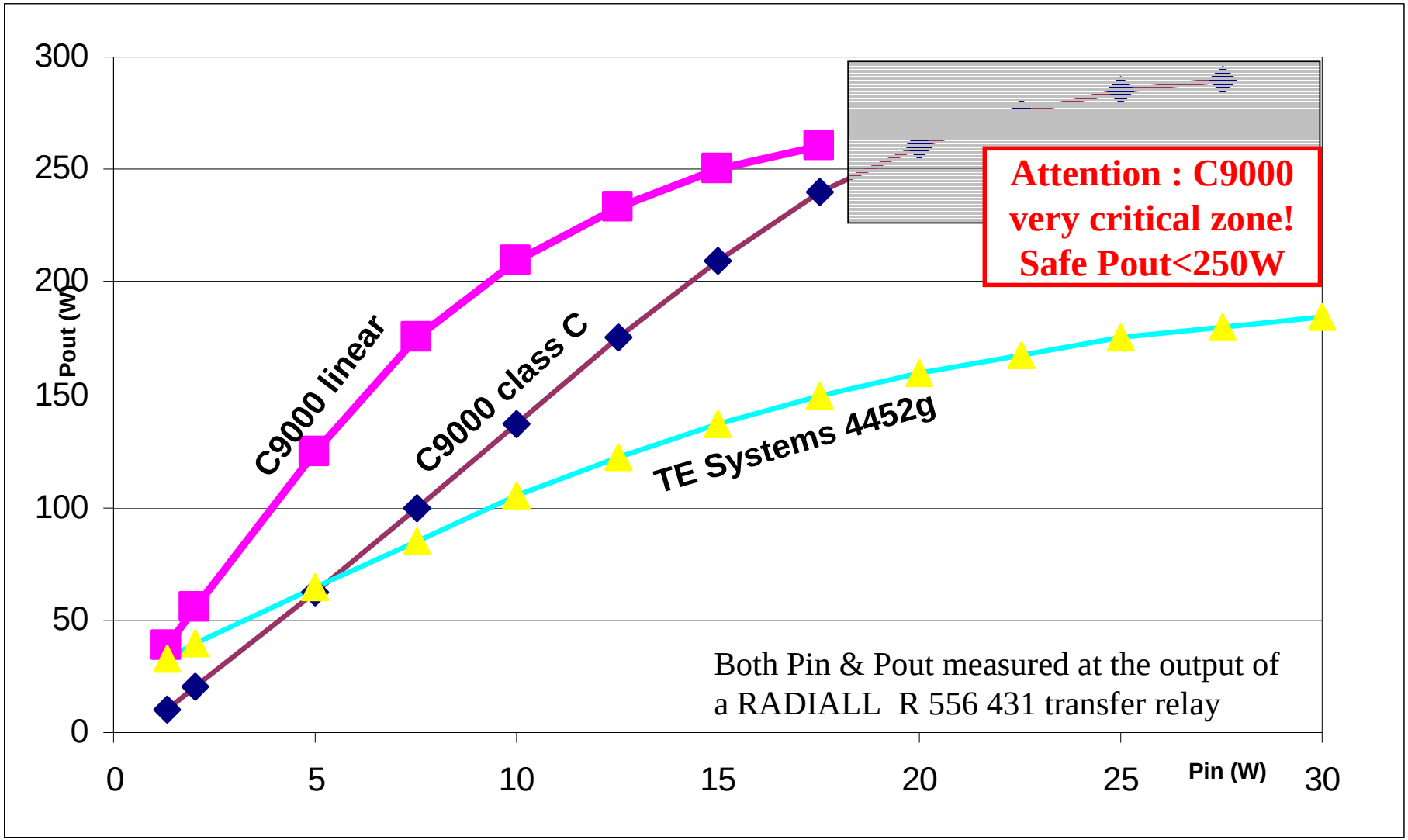
Ericsson Compact 9000 UHF : meas setup



Ericsson Compact 9000 UHF : 28 Volt SMA transfer relay

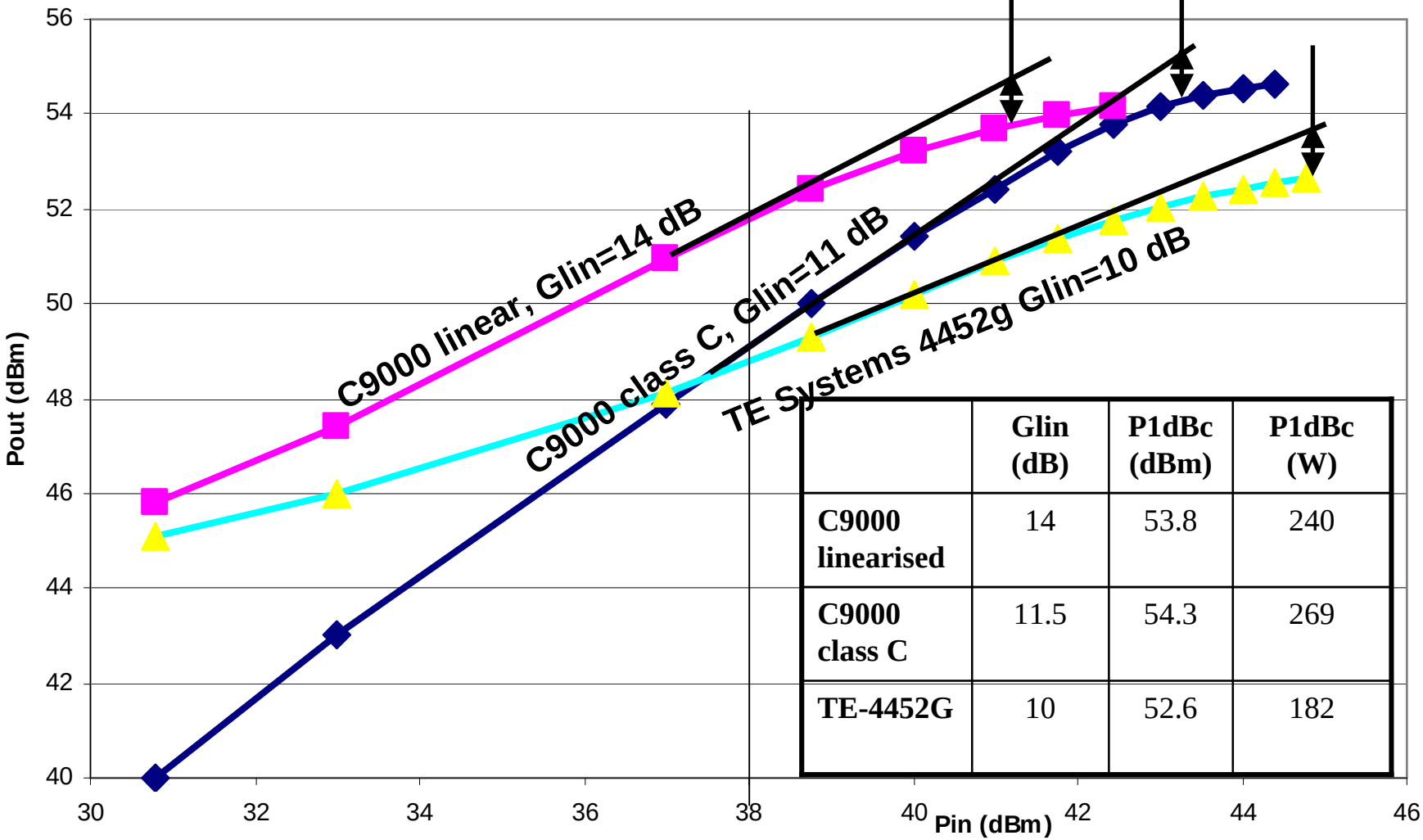
Ericsson Compact 9000 UHF : Pout / Pin à 432 MHz

with 2 transistors TP3069



Ericsson C9000 à 432 MHz: Pout versus Pin

with 2 transistors TP3069



	Glin (dB)	P1dBc (dBm)	P1dBc (W)
C9000 linearised	14	53.8	240
C9000 class C	11.5	54.3	269
TE-4452G	10	52.6	182