



REPORT

issued by an FCC listed Laboratory Reg. no. 93866
The test site complies with RSS 212, Issue 1, Industry Canada file no. :IC 3482.



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Datum/Date

2002-10-25

Rev. 2003-01-16

Beteckning/Reference

F219009-F24

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1(1)

Equipment Authorization measurements on WCDMA Base station 1900 MHz with FCC ID: B5KPROJ1192211-1

(9 enclosures)

Test objects

Transceiver Unit TRX PS1, ROJ 119 2211/1, R1B,
Amplifier unit / MCPA, KRB 90102/3, R1A.

Summary

Standard	Compliant	Enclosure	Remarks
FCC CFR 47			
2.1046 RF Power output	Yes	2	
2.1047 Modulation characteristics	Yes	3	
2.1049 Occupied bandwidth	Yes	4	
2.1051 Spurious emission at antenna	Yes	5	
2.1053 Field strength of spurious radiation	Yes	6	
2.1055 Frequency stability	Yes	7	

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FCC ID: B5KPROJ1192211-1

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Description - Equipment Under Test (EUT)

Equipment: WCDMA Base station transceiver 1900 MHz

Tx Frequency range: Single frequency 1947.5 MHz
(Block D: 1945.0-1950.0 MHz)

Tested Channel: 1947.5 MHz.

Product number: TRX PS1, ROJ 119 2211/1, R1B
Serial number: See Hardware list in enclosure 9

RF conducted measurements were done on,
TRX PS1, ROJ 119 2211/1, R1B, s/n A534170919 and
Amplifier unit / MCPA, KRB 90102/3, R1A, s/n U100025223.
All RF conducted measurements were done at the output connector J1.

EUT configuration:

The transmitters were set-up according to Test model 1 in the standard
3GPP TS 25.141 V5.4.0 (2002-09).
16 DPCH:s at 30 ksps (SF=128) distributed randomly across the code space, at random
power levels and random timing offsets are defined so as to simulate a realistic scenario
which may have high PAR (Peak to Average ratio).

Manufacturer's
representative: Larry Lindström, Ericsson AB

Purpose of test

The purpose of the tests is to verify compliance with the performance characteristics
specified in FCC CFR47.

Reservation

The test results in this report apply only to the particular Equipment Under Test (EUT) as
declared in the report.

Delivery of test object

The test object was delivered: 2002-10-13

Test engineers

Peter Grahn
Jonas Bremholt
Fredrik Isaksson

Test witnesses

Larry Lindström, Ericsson AB
Wayne Ly, Ericsson AB

Sign:.....

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FCC ID: B5KPROJ1192211-1

RF Power output measurements according to 47CFR 2.1046

Date 2002-10-28	Temperature 22 °C ± 3 °C	Humidity 27 % ± 5 %
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Test set-up and Procedure

The measurements were made per 3GPP TS 25.141. Measurements were made at output connector J1. The output was connected to a Peak power analyser via a 50 ohm attenuator. The RF power was measured with variation in supply voltage at the highest power level. Test was performed on -48 V DC supply voltage system. The transmitter was set up according to Test Model 1 in 3GPP TS 25.141 during the measurements.

Measurement equipment	Calibration Due	SP number
Boonton RF Peak power meter/analyser	2002-12	503 144
Boonton Power sensor 56518-S/4	2003-02	503 146
Multimeter Fluke 87	2003-09	502 190
Testo 610, Temperature and humidity meter	2002-11	502 658

Results

Nominal power -48 V DC

Rated output power level at output connector J1: 43 dBm

Test conditions		Transmitter power (dBm) Average Block D, 1947.5 MHz
T _{nom} 22°C	V _{nom} -48 V DC	42.4
T _{nom} 22°C	V _{min} -40.8 V DC	42.4
	V _{max} -55.2 V DC	42.4
Measurement uncertainty		0.5 dB

Limits (according to 3GPP TS 25.141)

The deviation of output power shall not be greater than ±2 dB of the maximum rated output power.

Complies?	Yes
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Modulation characteristics measurements according to 47CFR 2.1047

Date 2002-10-21	Temperature 21 °C ± 3 °C	Humidity 37 % ± 5 %
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Test set-up and Procedure

The measurement was made per 3GPP TS 25.141. Measurements were made at output connector J1. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during measurement. The transmitter was set up according to Test Model 1 in 3GPP TS 25.141 during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSU s/n 1129.9003.08	2003-04	-
Multimeter Fluke 87	2003-09	502 190
Testo 610, Temperature and humidity meter	2002-11	502 658

Results

Nominal Voltage -48 V DC
43 dBm output power at block D (1947.5 MHz)

Test conditions		Composite EVM (% _{RMS})
Supply voltage DC (V)	T (°C)	Output J1
-48.0	+20	8.0
Maximum EVM (% _{RMS})		8.0
Measurement uncertainty		2.0 % _{RMS}

Limits (according to 3GPP TS 25.141)

The Error Vector Magnitude (EVM) shall be less than 17.5%.

Complies?	Yes
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Occupied bandwidth measurements according to 47CFR 2.1049

Date 2002-10-29	Temperature 24 °C ± 3 °C	Humidity 29 % ± 5 %
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Test set-up and Procedure

The measurement test set-up was made per 3GPP TS 25.141. Measurements were made at output connector J1. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during the measurements. The transmitter was set up according to Test Model 1 in 3GPP TS 25.141 during the measurements.

Measurement equipment	Calibration Due	SP number
R&S ESI40	2003-08	503 125
Testo 610, Temperature and humidity meter	2002-11	502 658

Measurement uncertainty: 3.7 dB

Results

- Diagram 1 Block D (1947.5 MHz), OBW Reference level, +43 dBm output power
- Diagram 2 Block D (1947.5 MHz), OBW 26 dB points, +43 dBm output power
- Diagram 3 Block D (1947.5 MHz), OBW Band edge, +43 dBm output power

Limits

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10 \log P$ dB.

Complies?	Yes
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Sign:.....

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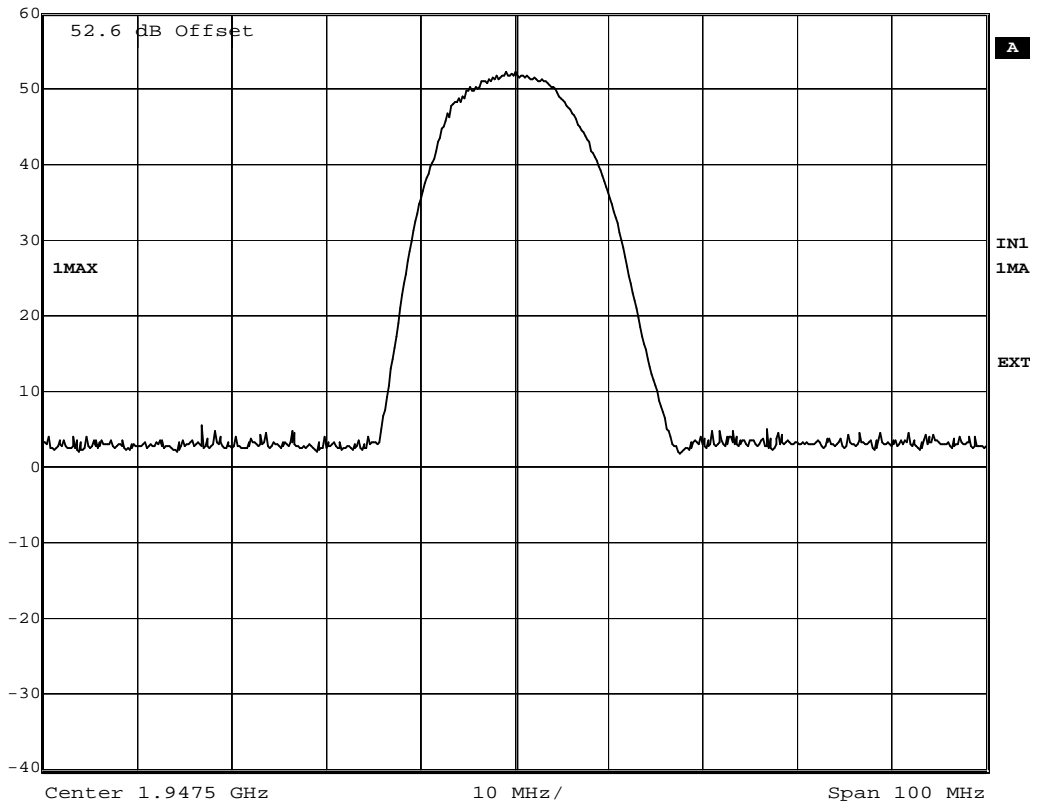
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Diagram 1 (3)
Encl. 4.1



Ref Lvl
60 dBm

RBW 10 MHz RF Att 20 dB
VBW 10 MHz
SWT 5 ms Unit dBm



Date: 29.OCT.2002 10:26:11

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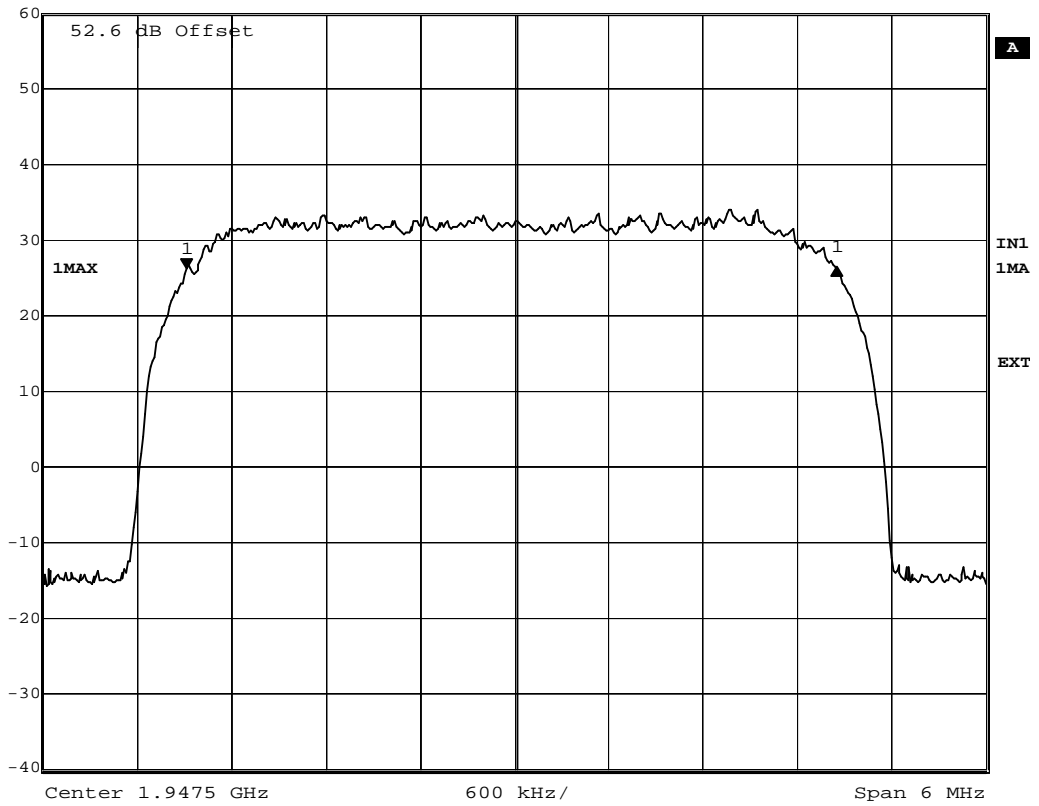
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Diagram 2 (3)

Encl. 4.1



Delta 1 [T1]	RBW	50 kHz	RF Att	20 dB
Ref Lvl	0.12 dB	VBW	50 kHz	
60 dBm	4.14228457 MHz	SWT	6 ms	Unit dBm



Date: 29.OCT.2002 10:31:41

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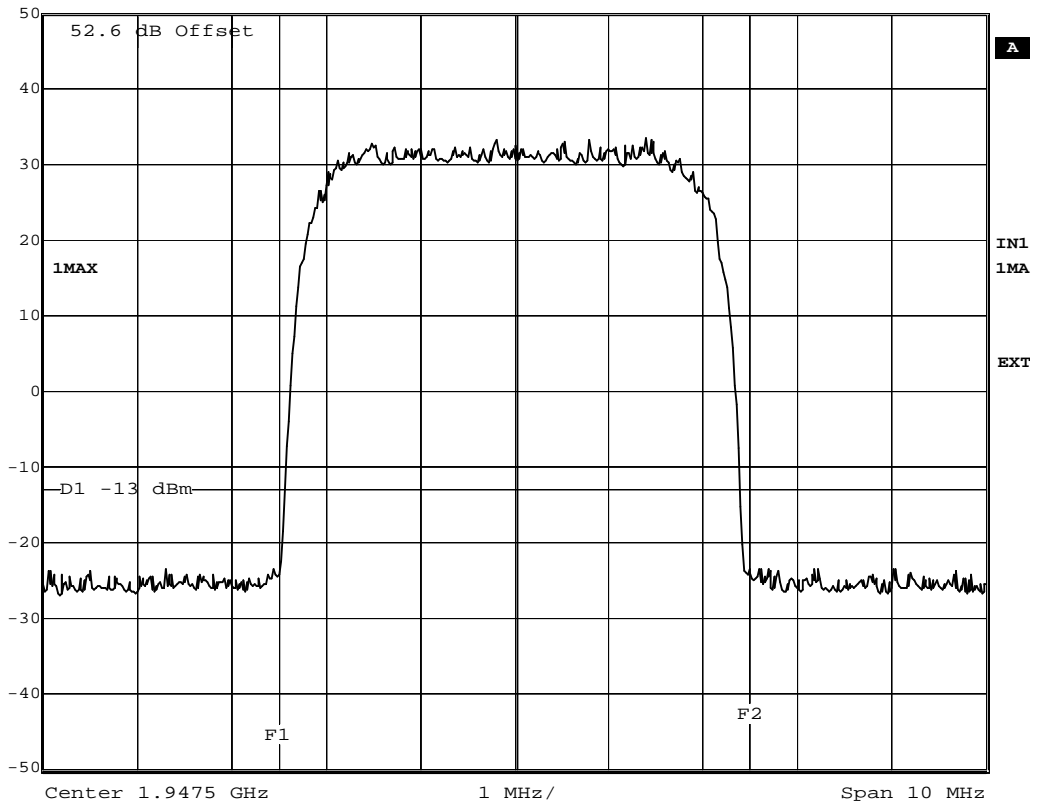
Diagram 3 (3)

Encl. 4.1



Ref Lvl
50 dBm

RBW 50 kHz RF Att 10 dB
VBW 50 kHz
SWT 10 ms Unit dBm



Date: 29.OCT.2002 10:37:19

Sign:.....

Conducted spurious emission measurements according to 47CFR 2.1051

Date	Temperature	Humidity
2002-10-28	22 °C ± 3 °C	27 % ± 5 %
2002-10-29	24 °C ± 3 °C	29 % ± 5 %

Test set-up and Procedure

The measurement was made per ANSI/TIA/EIA-603-1992. Measurements were made at output connector J1. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during the measurements. The transmitter was set up according to Test Model 1 in 3GPP TS 25.141 during the measurements.

Measurement equipment	Calibration Due	SP number
R&S ESI40	2003-08	503 125
Testo 610, Temperature and humidity meter	2002-11	502 658

Measurement uncertainty: 3.7 dB

Results

Diagram 1: Output J1, Block D (1947.5 MHz), +43 dBm

The two highest conducted average emission levels relative to the limit is reported in the table below.

Frequency (MHz)	Average Amplitude (dBm)	Limit (dBm)	Compliant
3 895	-38.5	-13.0	Yes
5 842.5	-40.9	-13.0	Yes

Limits

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10 \log P$ dB.

Complies?	Yes
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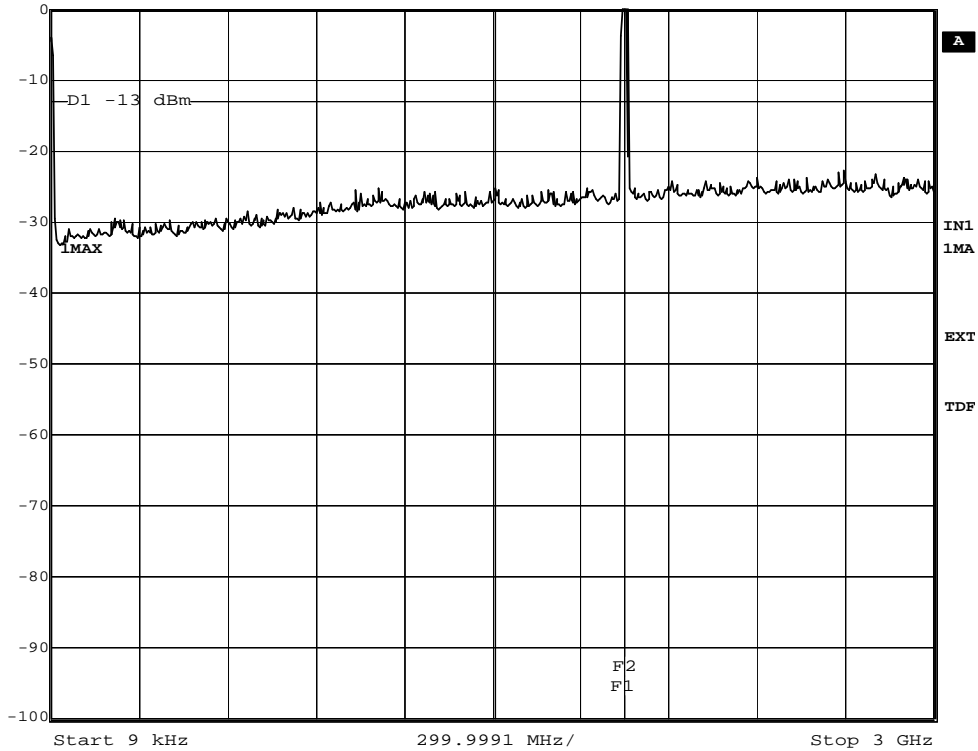
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Diagram 1 (1)
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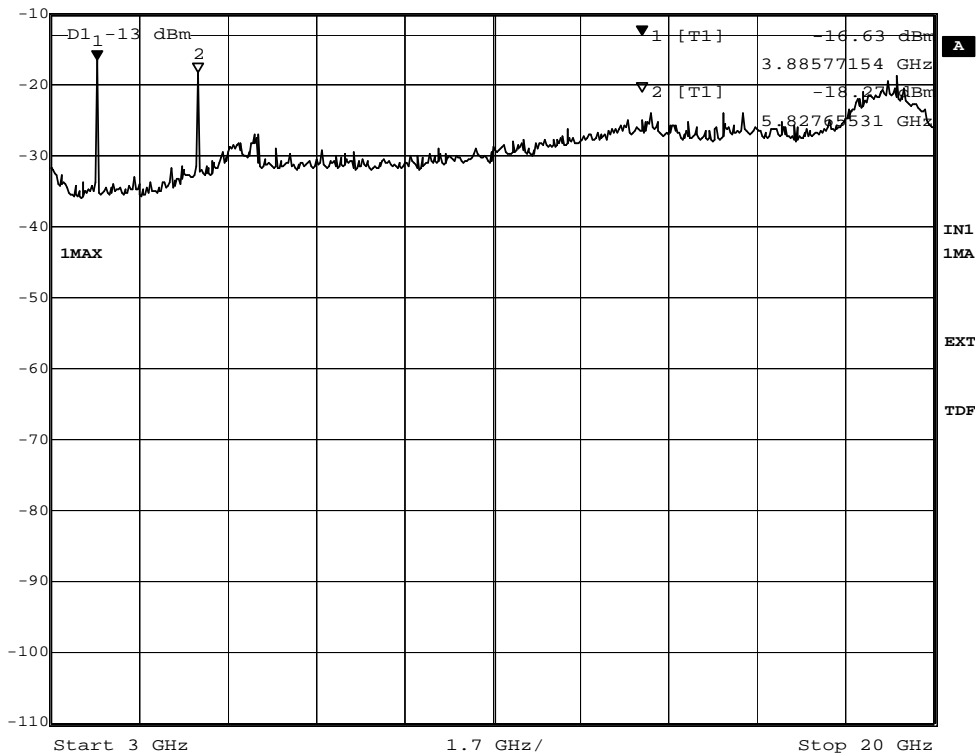
Ref Lvl 0 dBm
RBW 10 MHz RF Att 10 dB
VBW 10 MHz
SWT 5 ms Unit dBm



Date: 28.OCT.2002 10:41:34



Marker 1 [T1] RBW 10 MHz RF Att 0 dB
Ref Lvl -16.63 dBm VBW 10 MHz
-10 dBm 3.88577154 GHz SWT 170 ms Unit dBm



Date: 28.OCT.2002 10:14:26

Sign:.....

Field strength of spurious radiation measurements according to 47CFR 2.1053

Date	Temperature	Humidity
2002-10-14	20 °C ± 3 °C	27 % ± 5 %
2002-10-15	21 °C ± 3 °C	25 % ± 5 %
2002-10-16	22 °C ± 3 °C	26 % ± 5 %

Test set-up and Procedure

The measurement procedure is per ANSI/TIA/EIA-603-1992. The semi anechoic chamber is listed at FCC, Columbia with registration number: 93866. The test site also complies with RSS 212, Issue 1, Industry Canada file no. :IC 3482.

The transmitters were set up according to Test Model 1 in 3GPP TS 25.141 during the measurements.

The measurements were performed with both horizontal and vertical polarisation of the antenna. The antenna distance was 3 m and above 18 GHz the antenna distance was 1 m.

A pre-measurement was first performed:

In the frequency range 9 k-30 MHz the measurement was performed in field strength. The limit in power, -13 dBm, was recalculated to field strength in free space, 82 dBµV/m.

In the frequency range 30 M-20 GHz the measurement was performed in power. A propagation loss in free space was calculated and used as a transducer. The used formula, was, propagation loss = $20 \log(4\pi \times \text{antenna distance} / \lambda)$.

The measurement procedure was as the following:

1. The pre-measurement was first performed with peak detector. The EUT was measured in eight directions and with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m.
2. Spurious radiation on frequencies closer than 20 dB to the limit was measured with the substitution method according to the standard.

Measurement equipment	Calibration Due	SP number
Anechoic chamber	-	15:115
R&S ESI 26	2003-05	503 292
Control computer	-	503 479
Software: R&S ES-K1, ver. 1.60	-	-
Chase Bilog antenna CBL 6111A	2003-12	503 182
EMCO loop antenna 6502	2004-07	502 916
EMCO Horn Antenna 3115	2004-11	502 175
EMCO Horn Antenna 3116	2003-09	503 279
MITEQ Low Noise Amplifier	2003-07	503 277
Testo 615, Temperature and humidity meter	2003-08	503 505

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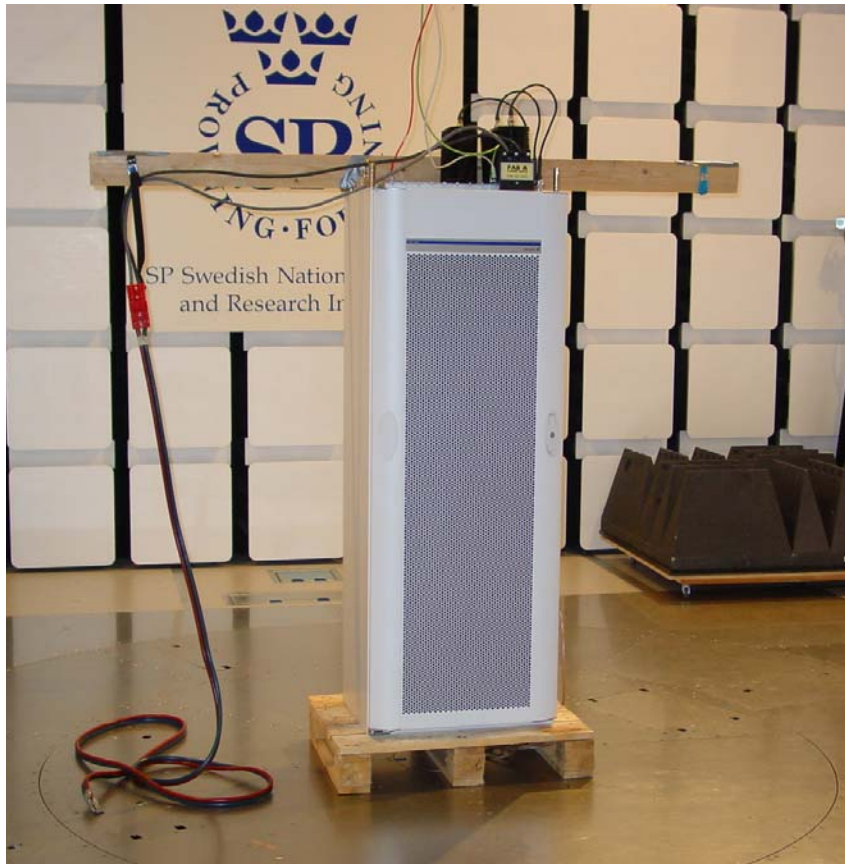
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The test set-up during the spurious radiation measurements can be seen in the picture below.



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Results

Nominal Voltage -48 V DC

Output power: +43 dBm

The spurious radiation measured with the substitution method can be found in the table below:

		Spurious emission level (dBm)	
Frequency (MHz)	RBW	Vertical (9k-30MHz: Longitudinal)	Horizontal (9k-30MHz: Perpendicular)
0.009-0.15	200 Hz	All emission > 20 dB below limit	All emission > 20 dB below limit
0.15-30	9 kHz	All emission > 20 dB below limit	All emission > 20 dB below limit
30-1000	100 kHz	All emission > 20 dB below limit	All emission > 20 dB below limit
1000-20 000	1 MHz	All emission > 20 dB below limit	All emission > 20 dB below limit
Measurement uncertainty		4.7 dB	

The pre-test emission spectra can be found in encl. 6.1:

Diagram 1: Radiated emission 9 k-30 MHz, perpendicular polarization

Diagram 2: Radiated emission 9 k-30 MHz, longitudinal polarization

Diagram 3: Radiated emission 30-1000 MHz, vertical and horizontal polarization

Diagram 4: Radiated emission 1-18 GHz, vertical and horizontal polarization

Diagram 5: Radiated emission 18-20 GHz, vertical and horizontal polarization

Limits

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10 \log P$ dB.

Complies?	Yes
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Sign:.....

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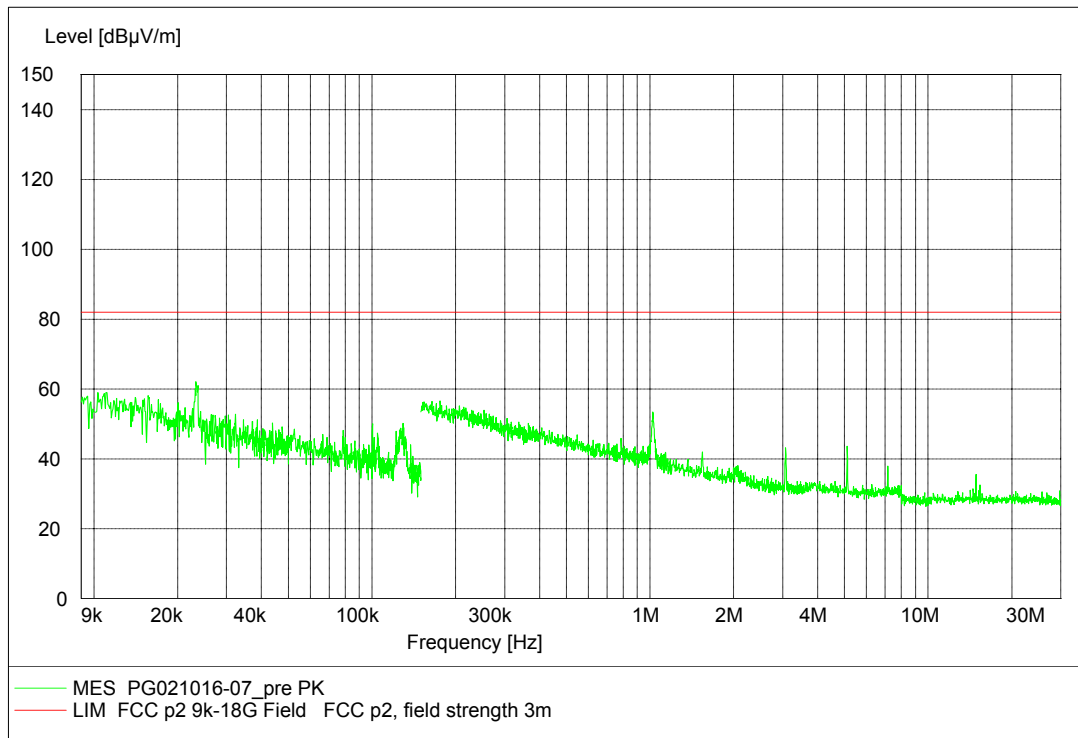
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Diagram 1(5)

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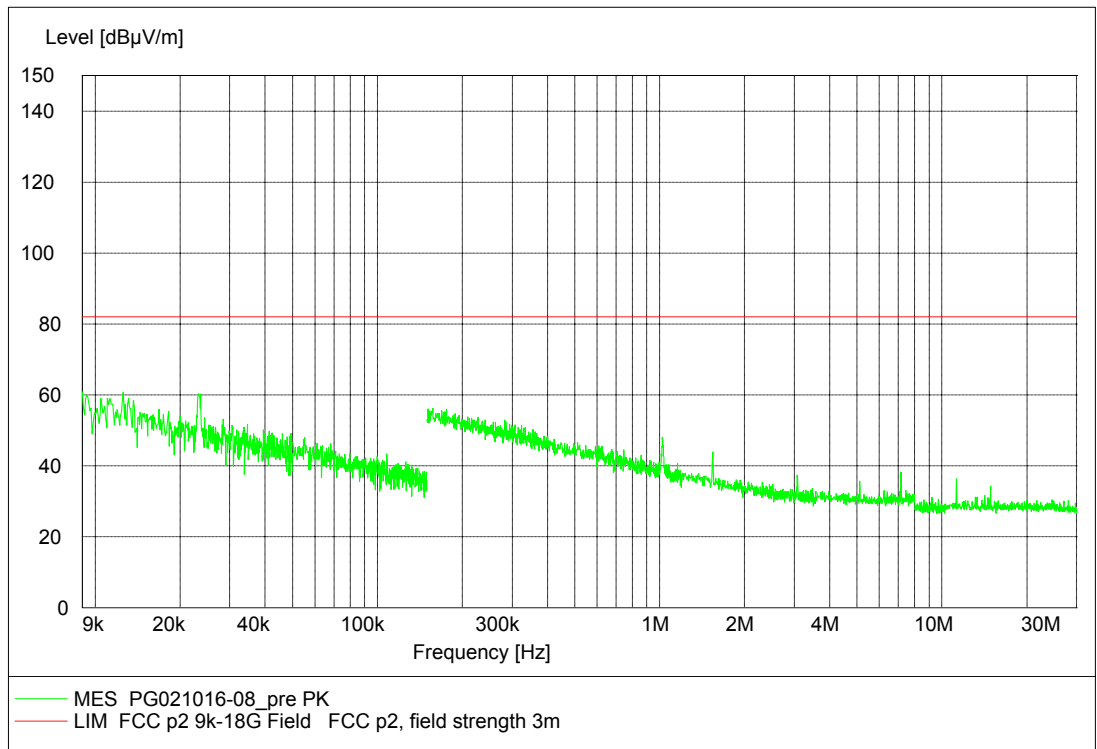
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Diagram 2(5)

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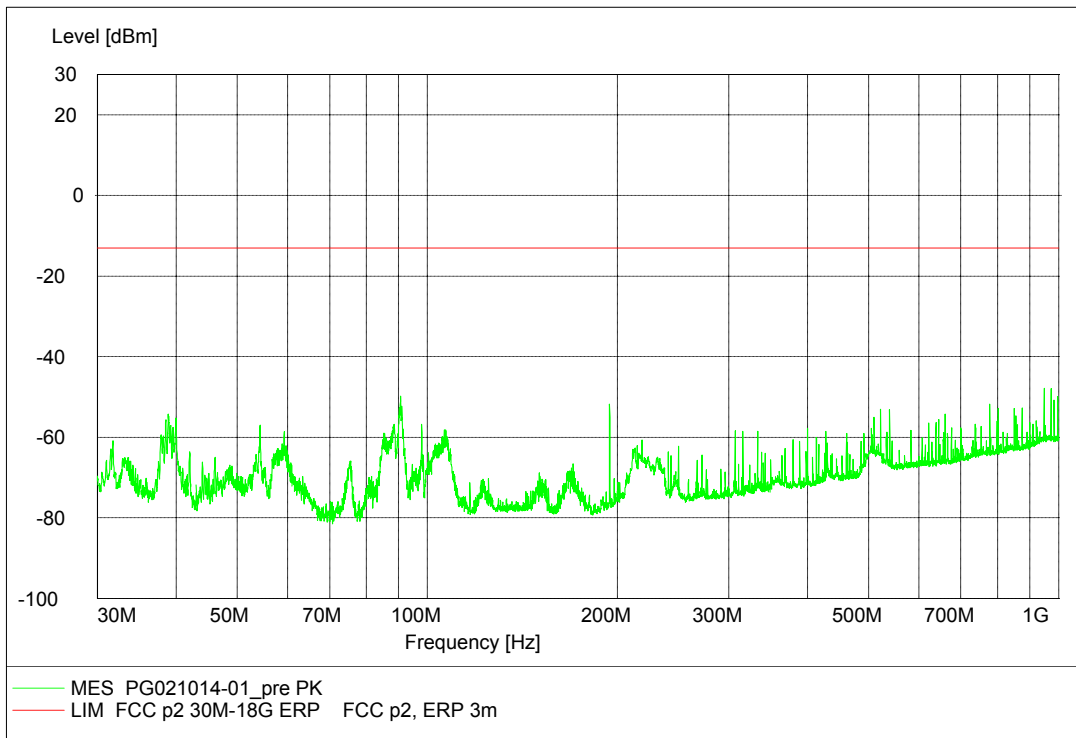
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Diagram 3(5)

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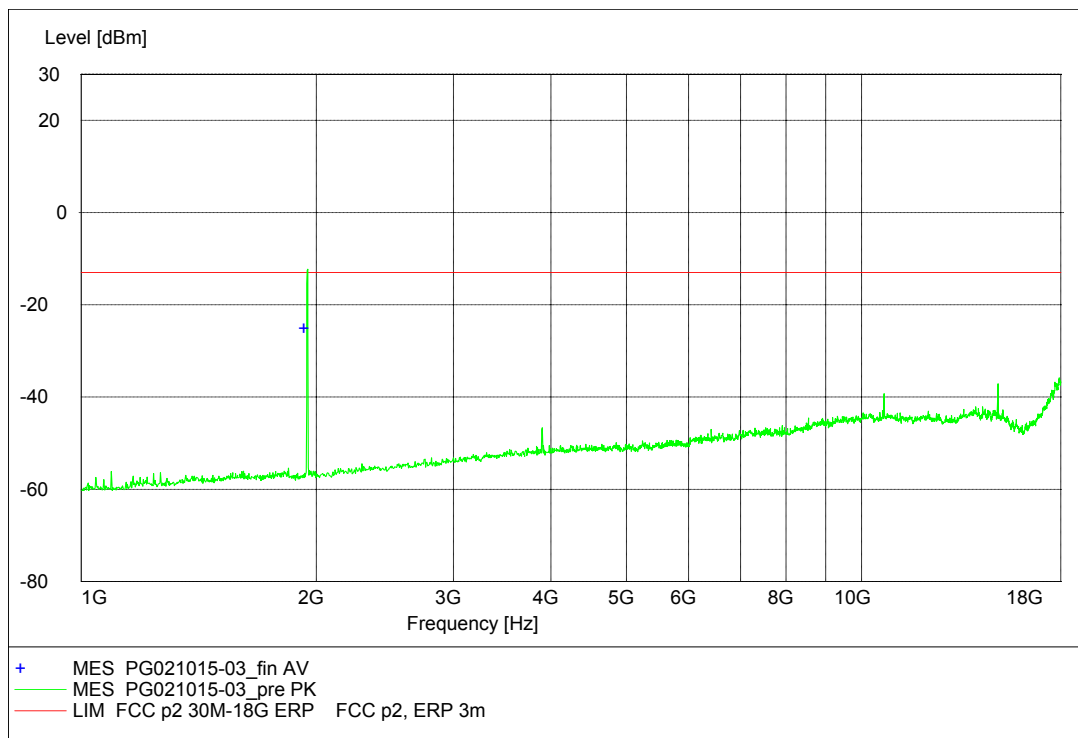
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Diagram 4(5)

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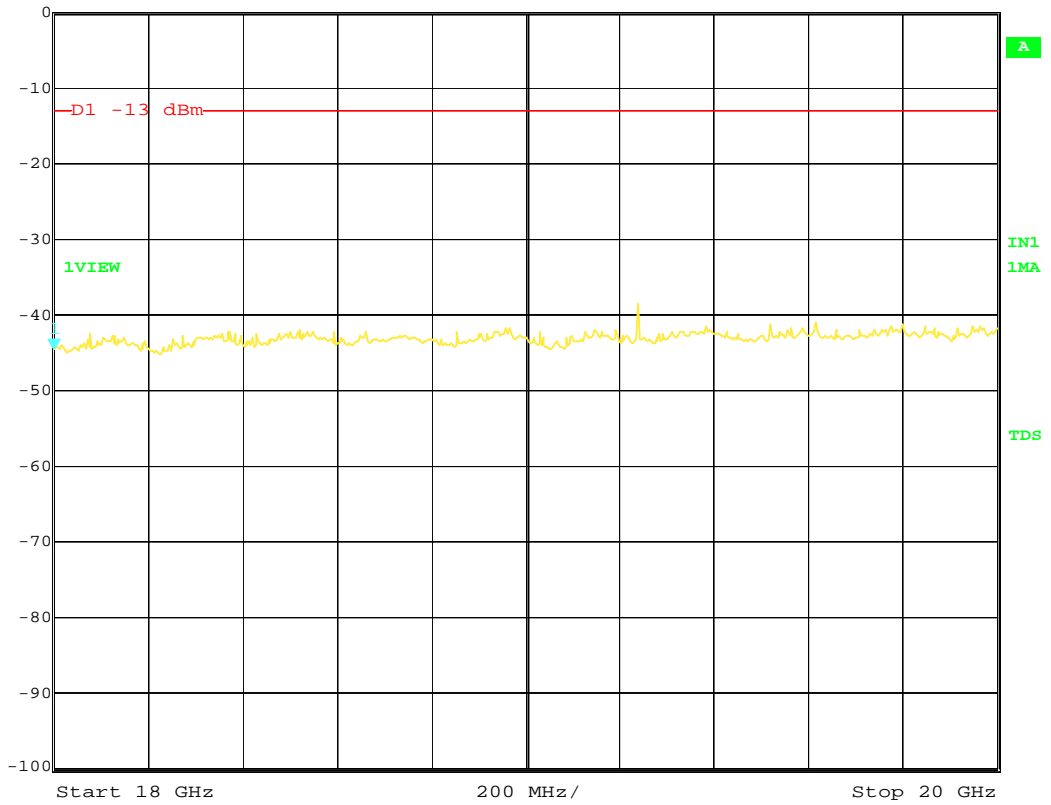
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Diagram 5(5)
Encl. 6.1



Ref Lvl 0 dBm
Marker 1 [T1] 18.00000000 GHz -44.57 dBm
RBW 1 MHz RF Att 10 dB
VBW 1 MHz
SWT 20 ms Unit dBm



Date: 15.OCT.2002 12:11:32

Sign:.....

Frequency stability measurements according to 47CFR 2.1055

Date	Temperature (test equipment)	Humidity (test equipment)
2002-10-21	21 °C ± 3 °C	37 % ± 5 %
2002-10-22	21 °C ± 3 °C	38 % ± 5 %
2002-10-23	21 °C ± 3 °C	39 % ± 5 %
2002-10-24	22 °C ± 3 °C	29 % ± 5 %

Test set-up and Procedure

The measurement was made per 3GPP TS 25.141. Measurements were made at output connector J1. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during measurement. The transmitter was set up according to Test Model 1 in 3GPP TS 25.141 during the measurements.

Measurement equipment	Calibration Due	SP number
Climate chamber	2002-10	503 546
R&S FSU s/n 1129.9003.08	2003-04	-
Multimeter Fluke 87	2003-09	502 190
Testo 610, Temperature and humidity meter	2002-11	502 658

Results

Nominal Voltage -48 V DC
 43 dBm output power at block D (1947.5 MHz)

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	T (°C)	Output J1
-48.0	+20	1
-55.2	+20	2
-40.8	+20	7
-48.0	+30	4
-48.0	+40	1
-48.0	+50	3
-48.0	+10	4
-48.0	+5	5
Maximum freq. error (Hz)		7
Measurement uncertainty		< ± 1 x 10 ⁻⁷

Limits (according to 3GPP TS 25.141)

The frequency Error shall be within ± 0.05 PPM (97.375 Hz).

Complies?	Yes
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EUT Hardware configuration list RBS 3202

Position	Product name	Product number	R-state	Serial number
	RBS cabinet 3202	2/BFE 401 1001	R1B	S871091388
	Door	SXX 109 4358/1650	R1A	--
	CU Unit	BMF 904 09/1	R9A	SA22451991
	BB Subrack, unequipped 26 slots	BFX 901 03/2	R3C	S871091366
	BB subrack fan unit	BKV 301 487/1	R2A	TH4A700052
1	SCB	ROJ 119 2108/2	R6F	T011696706
2	ET-M1	ROJ 119 2101/2	R7E	T011719760
3	Dummy board	SXX 107 8896/1	R3A	--
4	TUB	R0J 119 2104/3	R4E	T011831698
5	Dummy board	SXX 107 8896/1	R3A	--
6	BBIFB	ROJ 119 2114/1	R2D	TE72201257
7	Dummy board	SXX 107 8896/1	R3A	--
8	RAX	ROJ 119 2071/3	R2A	A534176134
9	RAX	ROJ 119 2071/3	R2A	A534176115
10	RAX	ROJ 119 2071/3	R2A	A534176103
11	Dummy board	SXX 107 8896/1	R2A	S885565918
12	Dummy board	SXX 107 8896/1	R2CA	S885594320
13	Dummy board	SXX 107 8896/1	R3A	--
14	Dummy board	SXX 107 8896/1	R3A	--
15	Dummy board	SXX 107 8896/1	R3A	--
16	Dummy board	SXX 107 8896/1	R3A	--
17	Dummy board	SXX 107 8896/1	R3A	--
18	Dummy board	SXX 107 8896/1	R3A	--
19	Dummy board	SXX 107 8896/1	R3A	--
20	GPB2	ROJ 119 2106/2	R4H	T011861004
21	Dummy board	SXX 107 8896/1	R3A	--
22	Dummy board	SXX 107 8896/1	R3A	--
23	Dummy board	SXX 107 8896/1	R3A	--
24	Dummy board	SXX 107 8896/1	R3A	--
25	Dummy board	SXX 107 8896/1	R3A	--
26	TXB	ROJ 119 2124/3	R1D	A534115005

Sign:.....

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Position	Product name	Product number	R-state	Serial number
	RF Subrack, unequipped 16 slots	BFX 901 02/2	R2B	S871091387
	RF subrack fan unit	BKV 301 487/1	R2A	TH4A700054
1	SCB	ROJ 119 2108/2	R6F	T011696831
2	RFIFB	ROJ 119 2115/2	R3E	T011731262
3	Dummy	SXK 107 8896/1	R3A	--
4	TRX PS1	ROJ 119 2211/1	R1B	A534170919
5	Dummy	SXK 107 8896/1	R3A	--
6	AIU	KRC 1011451/1	R1A	A40003YECM
7	TRX PS1	ROJ 119 2211/1	R1B	A534170919
8	Dummy	SXK 107 8896/1	R3A	--
9	AIU	KRC 1011451/1	R1A	A40003YHAB
10	TRX PS1	ROJ 119 2211/1	R1B	A534170919
11	Dummy	SXK 107 8896/1	R3A	--
12	AIU	KRC 1011451/1	R1A	A40003YECE
13	Dummy	SXK 107 8896/1	R3A	--
14	Dummy	SXK 107 8896/1	R3A	--
15	Dummy	SXK 107 8896/1	R3A	--
16	Dummy	SXK 107 8896/1	R2A	S885564255
	AMP Subrack, unequipped 6 slots	BFL 119 414/1	R1B	--
	MCPA hub			
1	Amplifier unit / MCPA	KRB 90102/3	R1A	U100025223
2	Dummy	--		
3	Amplifier unit / MCPA	KRB 90102/3	R1A	U100025214
4	Dummy	--		
5	Amplifier unit / MCPA	KRB 90102/3	R1A	U100025221
6	Dummy	--		
	AMP subrack fan unit	BKV 301 488/1	R3A	TH4A200046
	Power unit			

Software	Revision
SWTP	3.7

Description of EUT

The EUT is a UMTS Base station configured with three TRX units and three MCPA designed to provide mobile telephone users with a connection to a mobile network or the PSTN.

Sign:.....

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Photos

RBS 3202 Cabinet, -48 Volt DC system

Front view



Rear view



Sign:.....

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Open door view



Sign:.....

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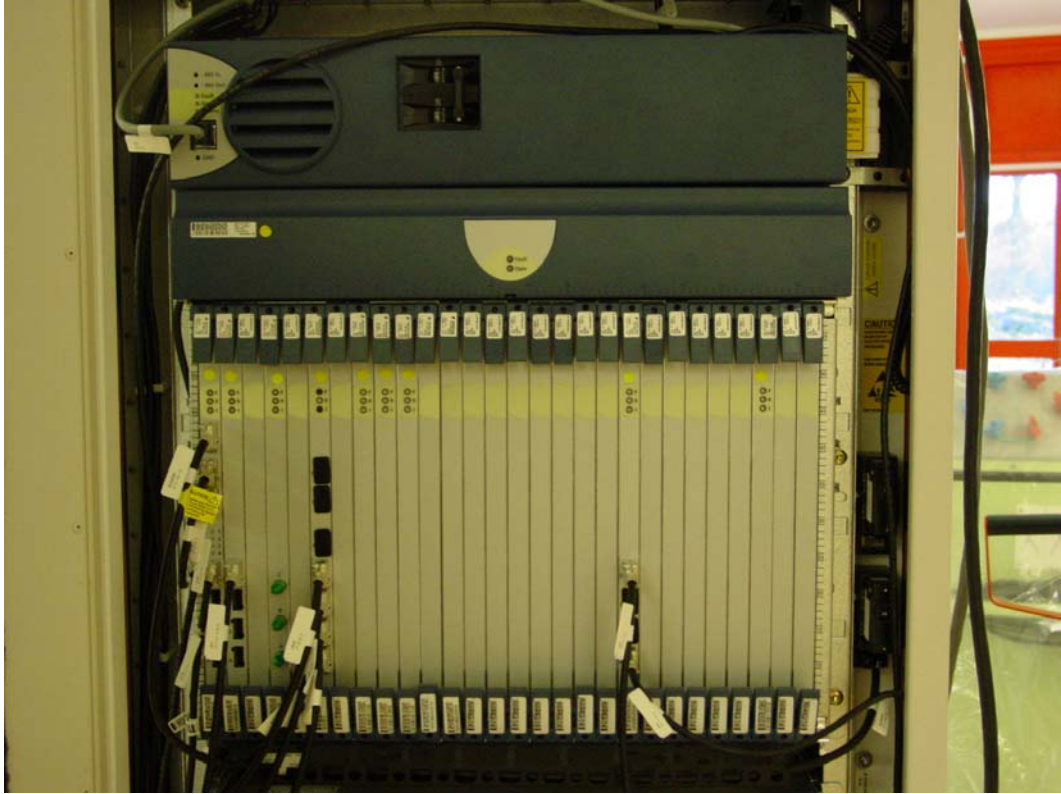
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BB Subrack,



RF Subrack



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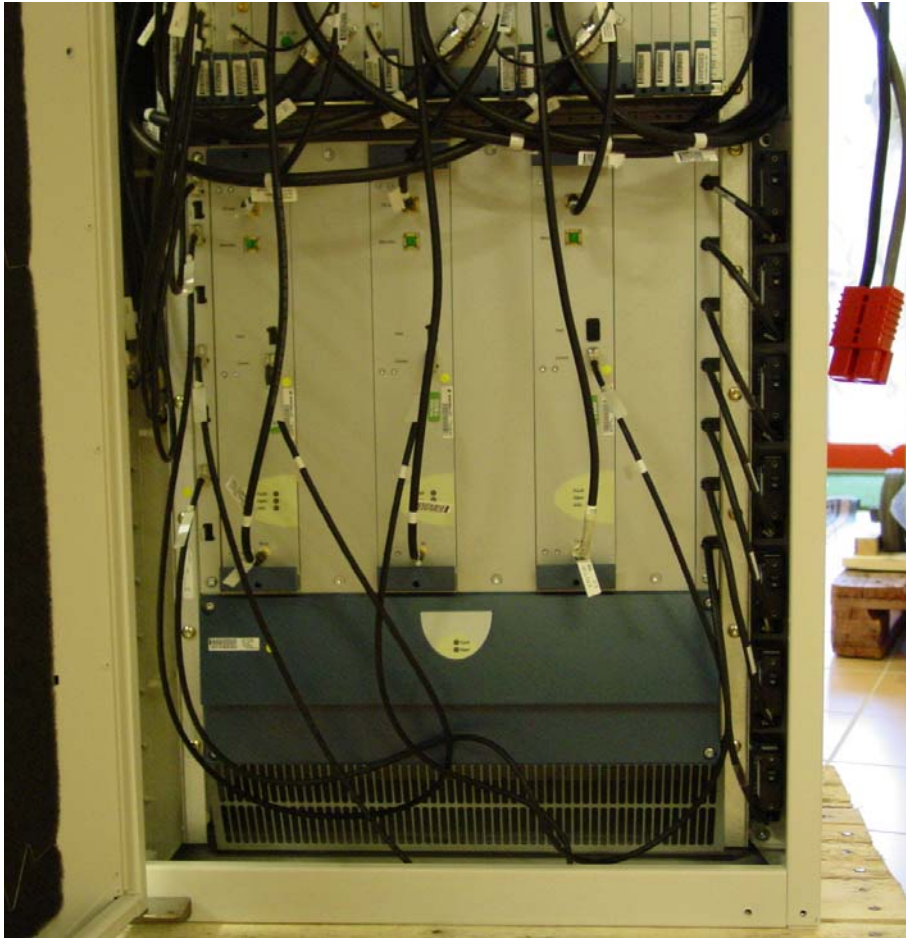
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AMP Subrack



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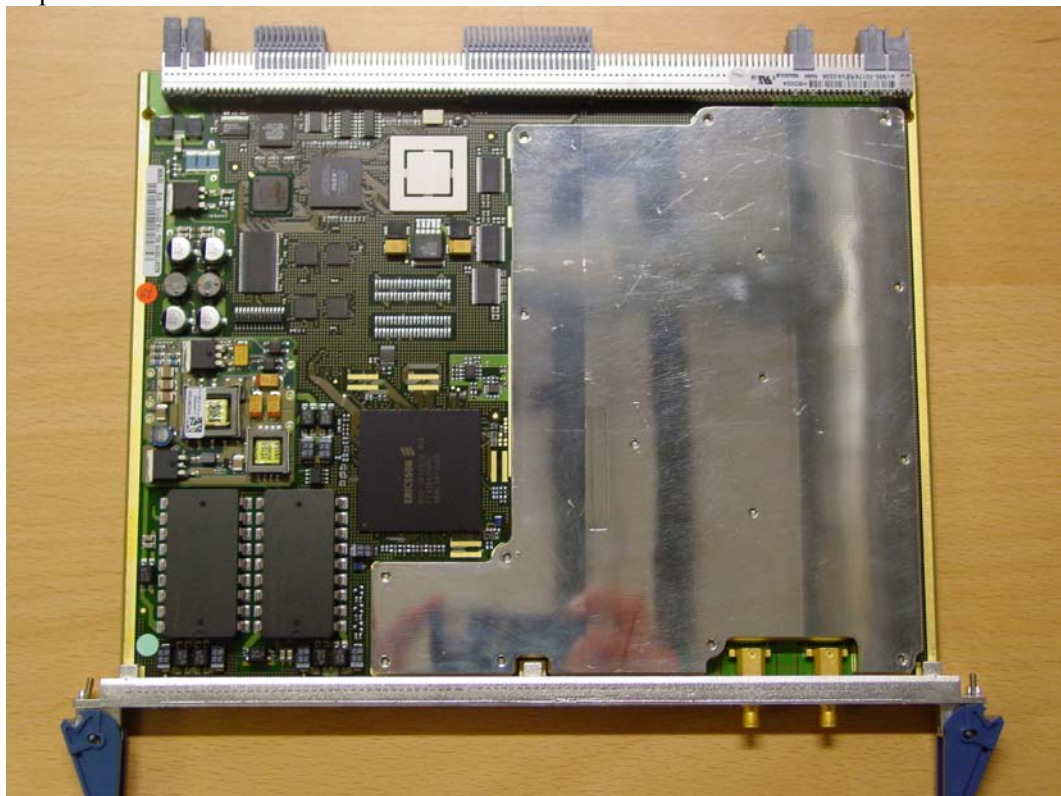
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Transceiver Unit, ROJ 119 2211/1, R1B

Front side



Top



Sign:.....

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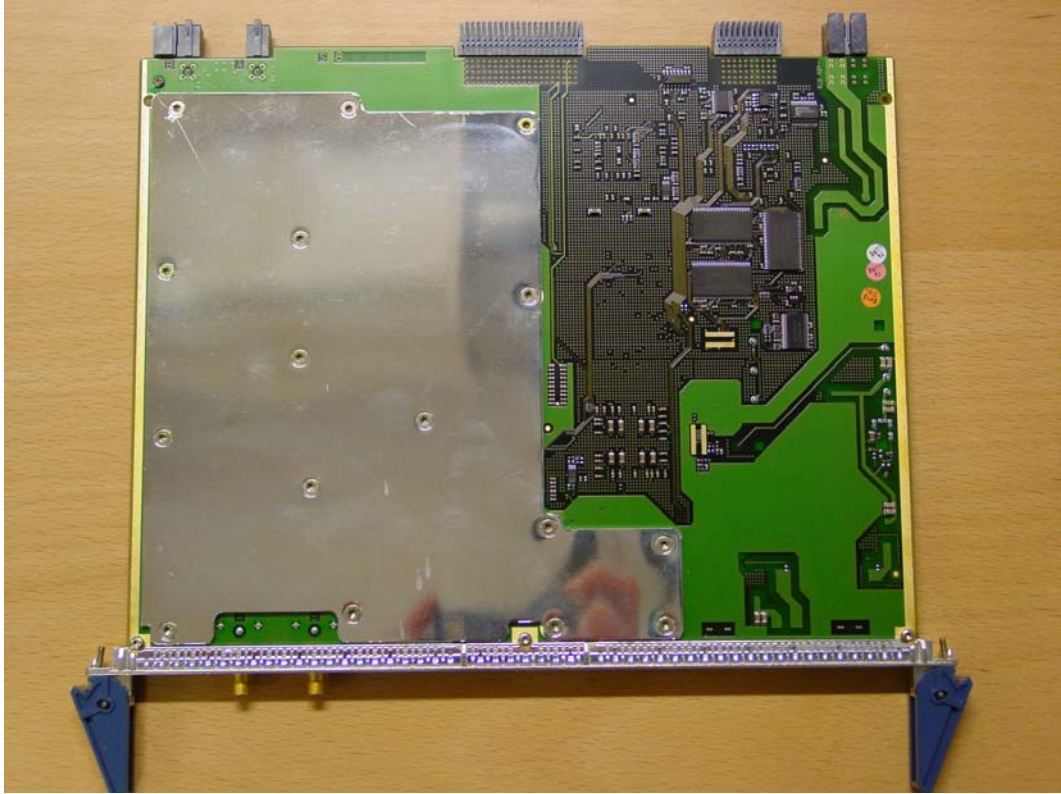
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Bottom side



ID Label



FCC ID:



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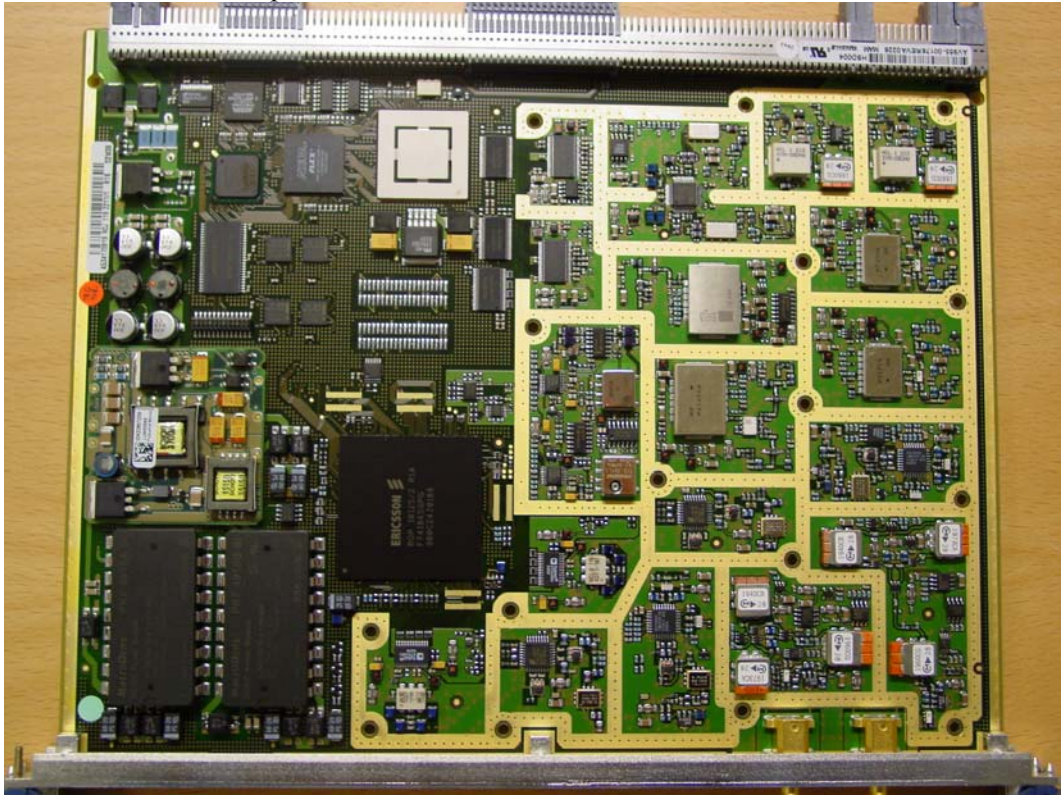
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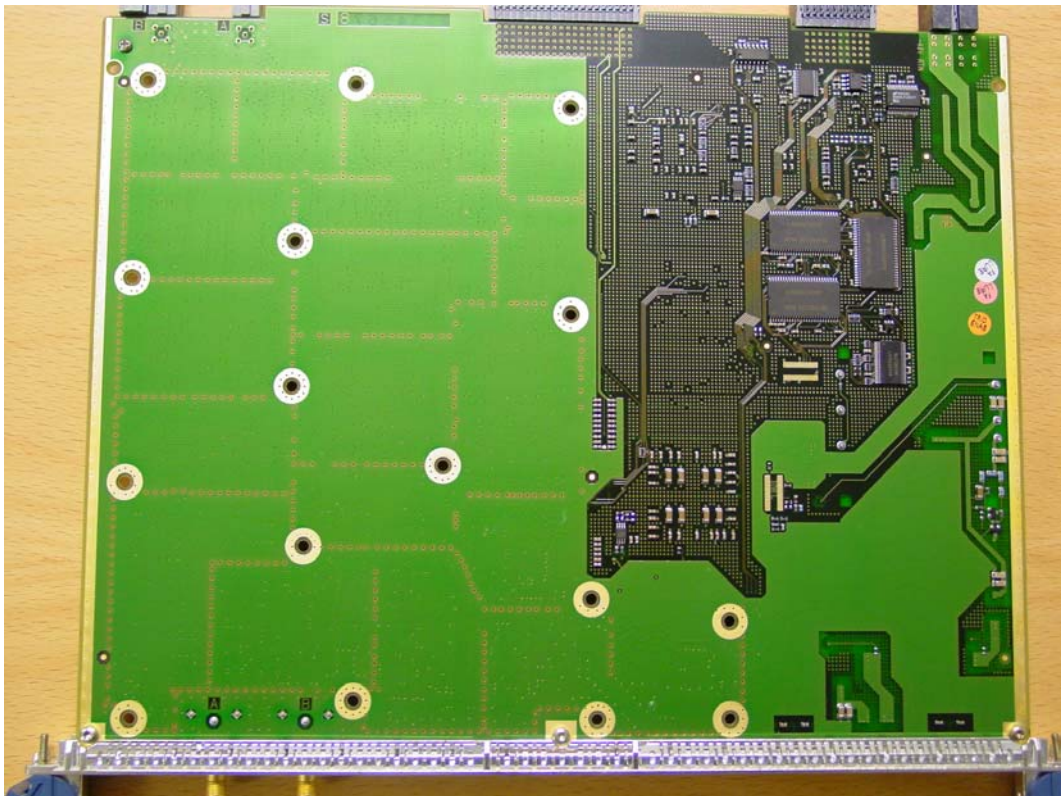
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Main board- PCB component side



Main board- PCB rear side



Sign:.....

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Amplifier Unit / MCPA, KRB 90102/3, R1A

Front side



Top



Sign:.....

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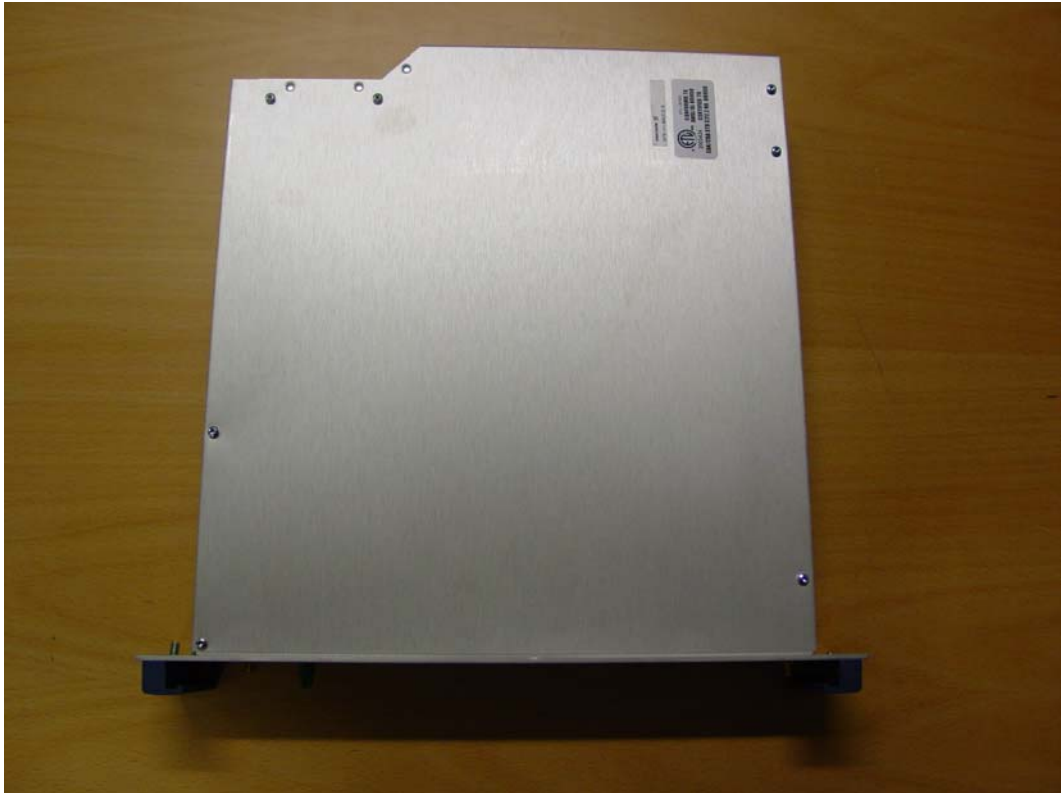
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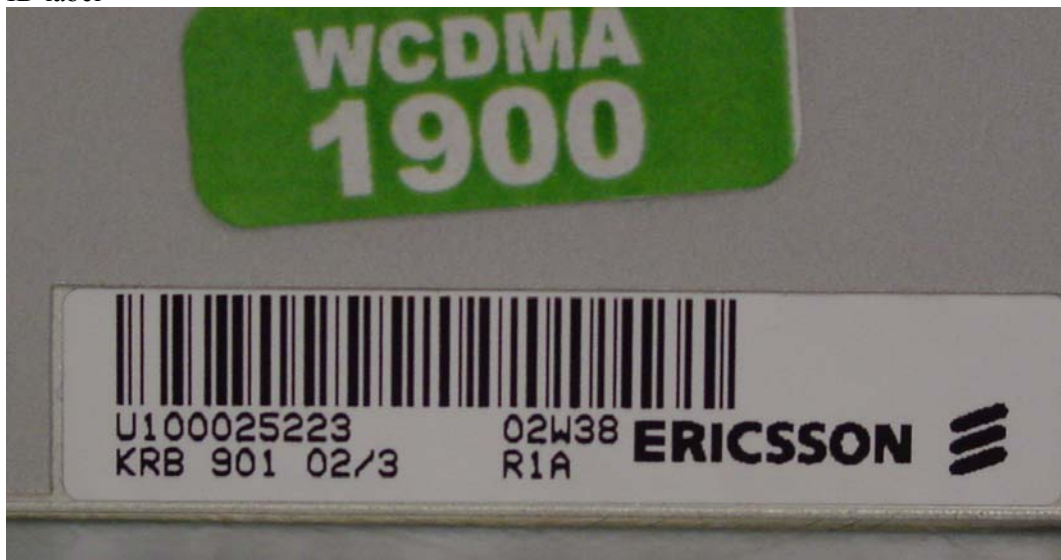
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Bottom side



ID label



Sign:.....

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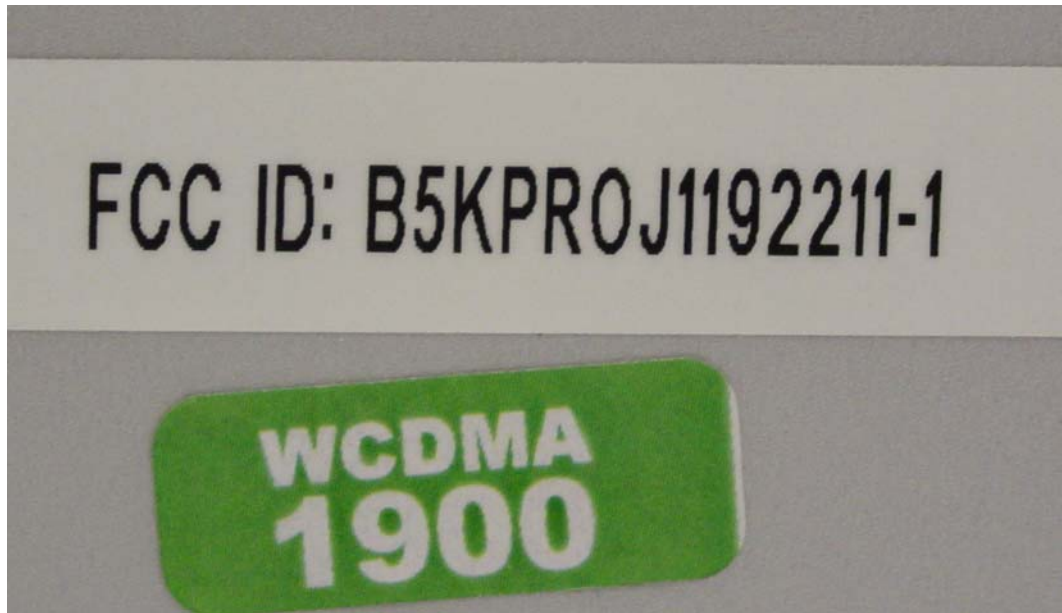
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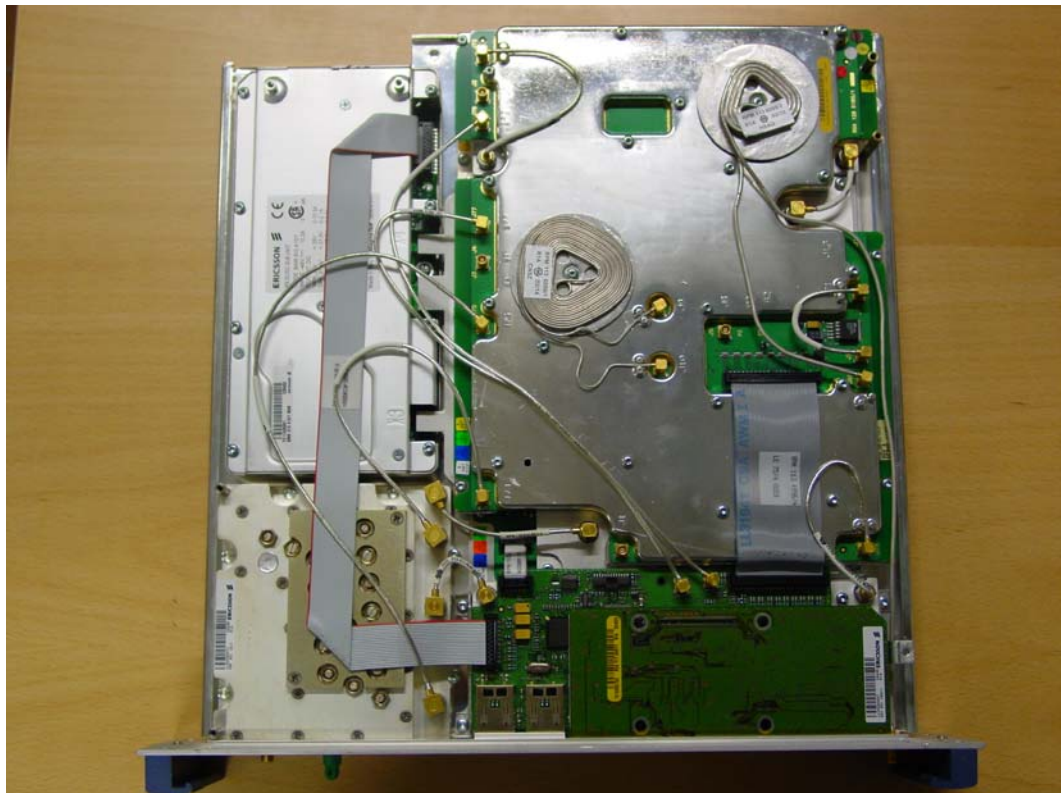
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Printed Board MCPA Radio Control ROA 128 0185/1 with lid



Sign:.....

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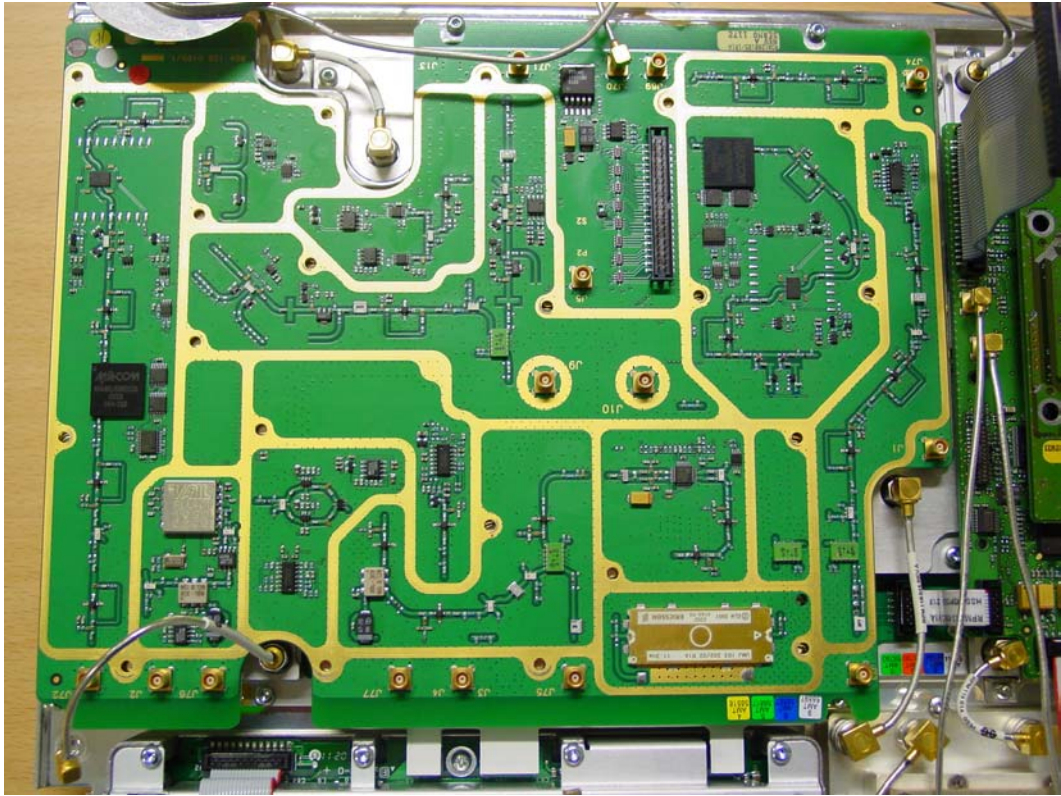
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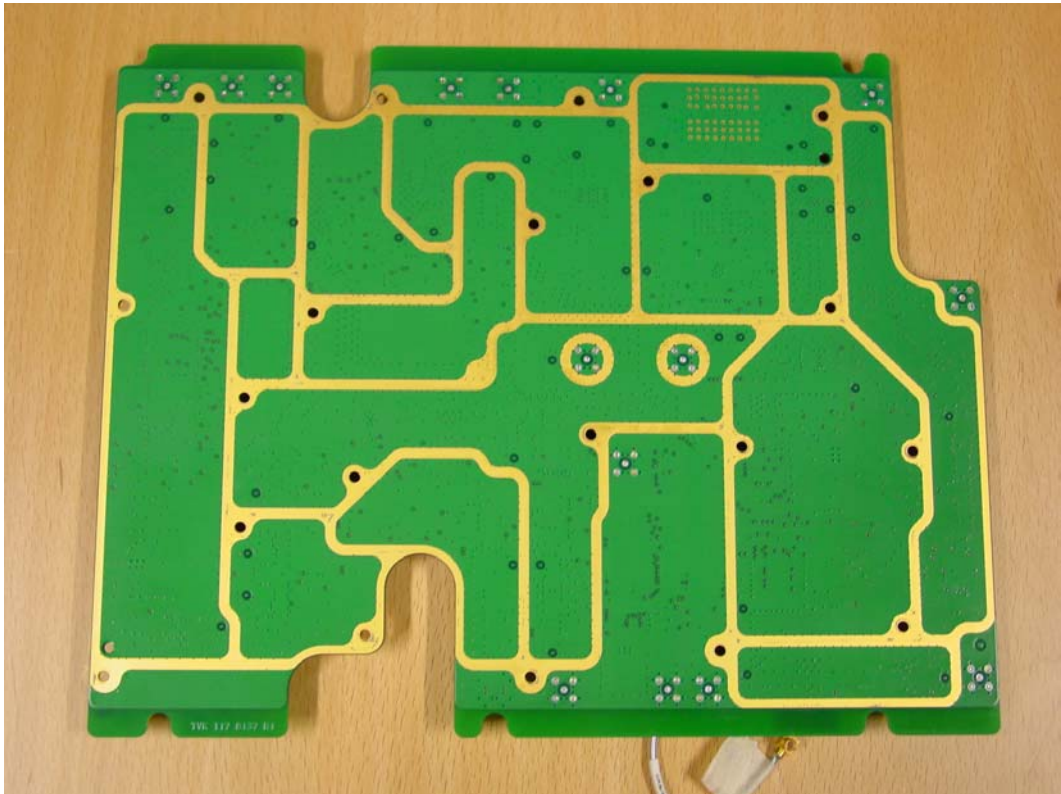
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Printed Board MCPA Radio Control ROA 128 0185/1



Backside Printed Board MCPA Radio Control ROA 128 0185/1



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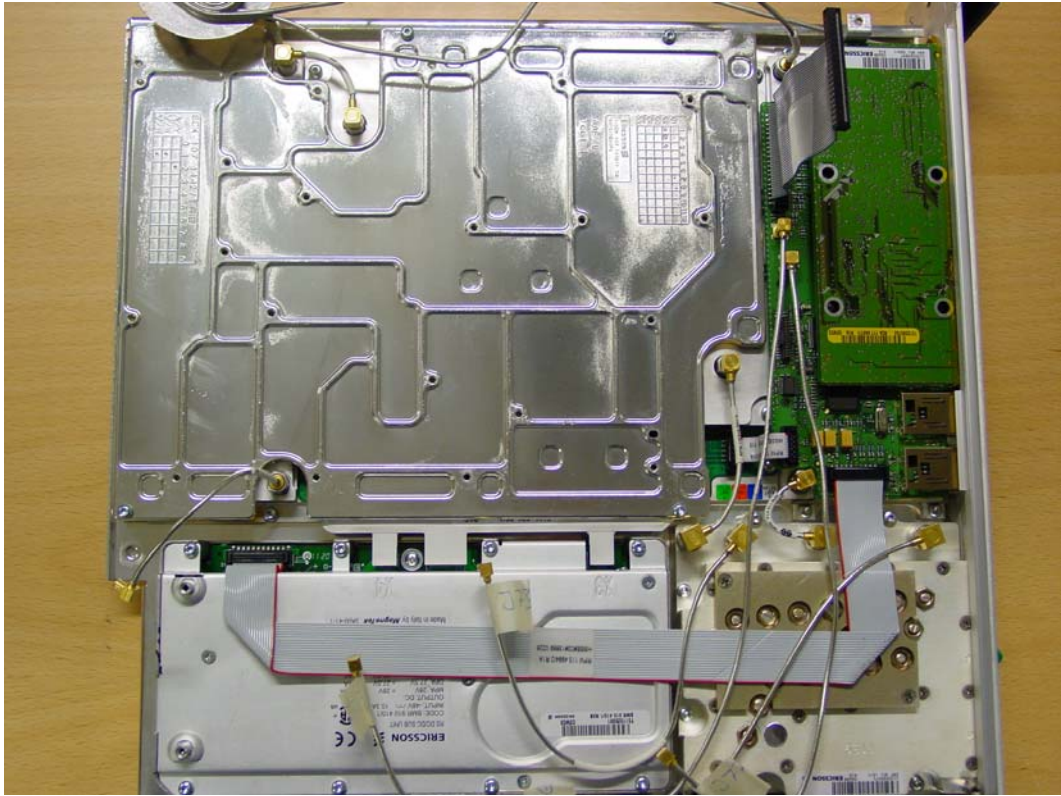
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Backside lid for Printed Board MCPA Radio Control ROA 128 0185/1



Printed Board MCPA Control Stage 1 ROA 117 8633/1



Sign:.....

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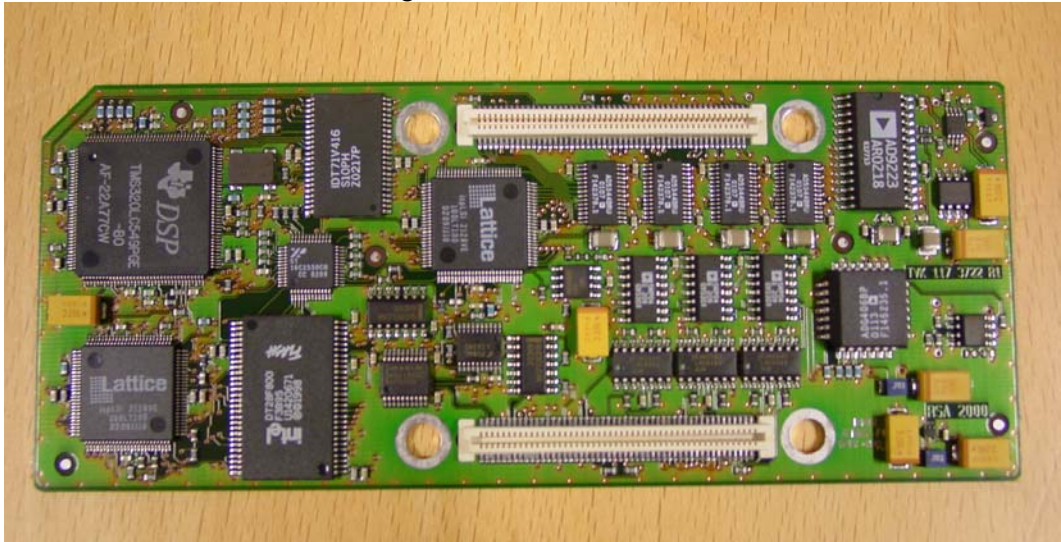
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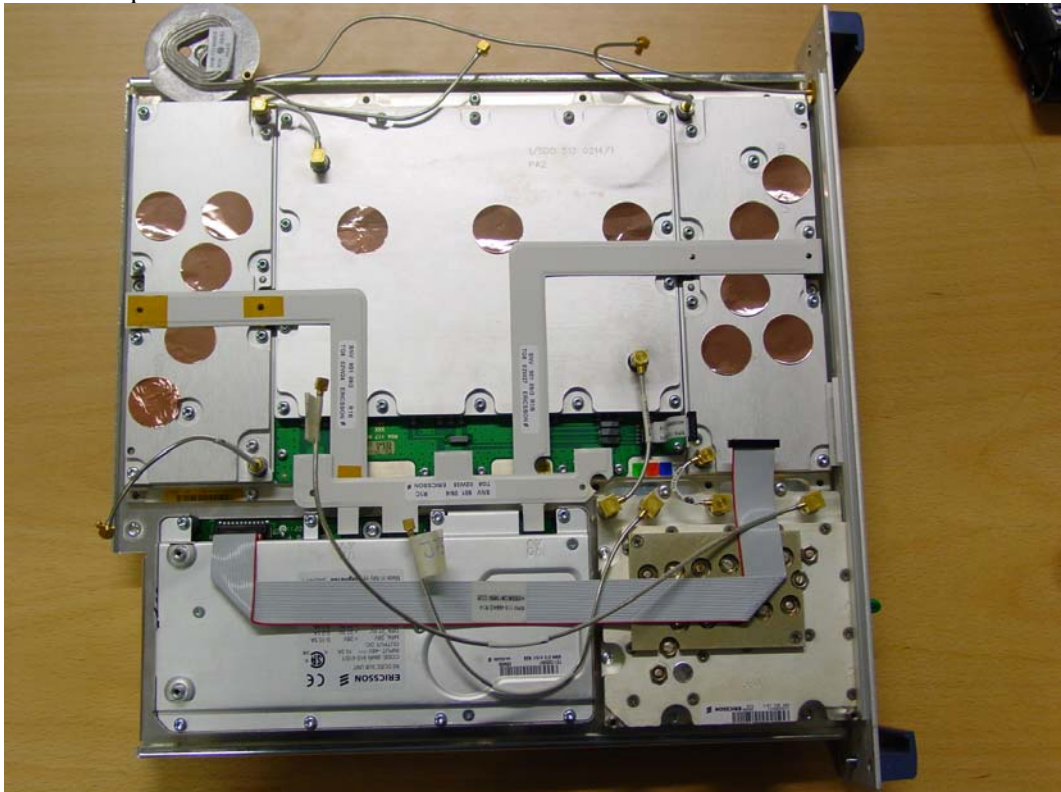
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Printed Board MCPA Control Stage 1 ROA 117 8497/1



Power Amplifier Block KRY 901 001/1 with lid



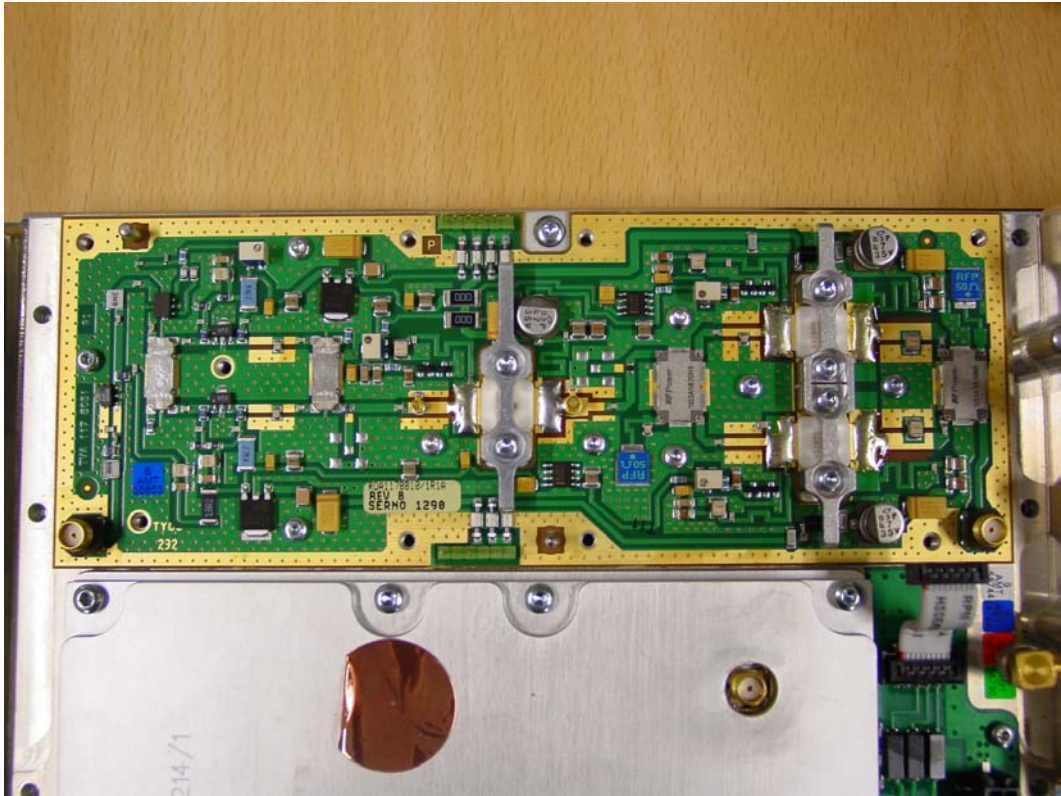
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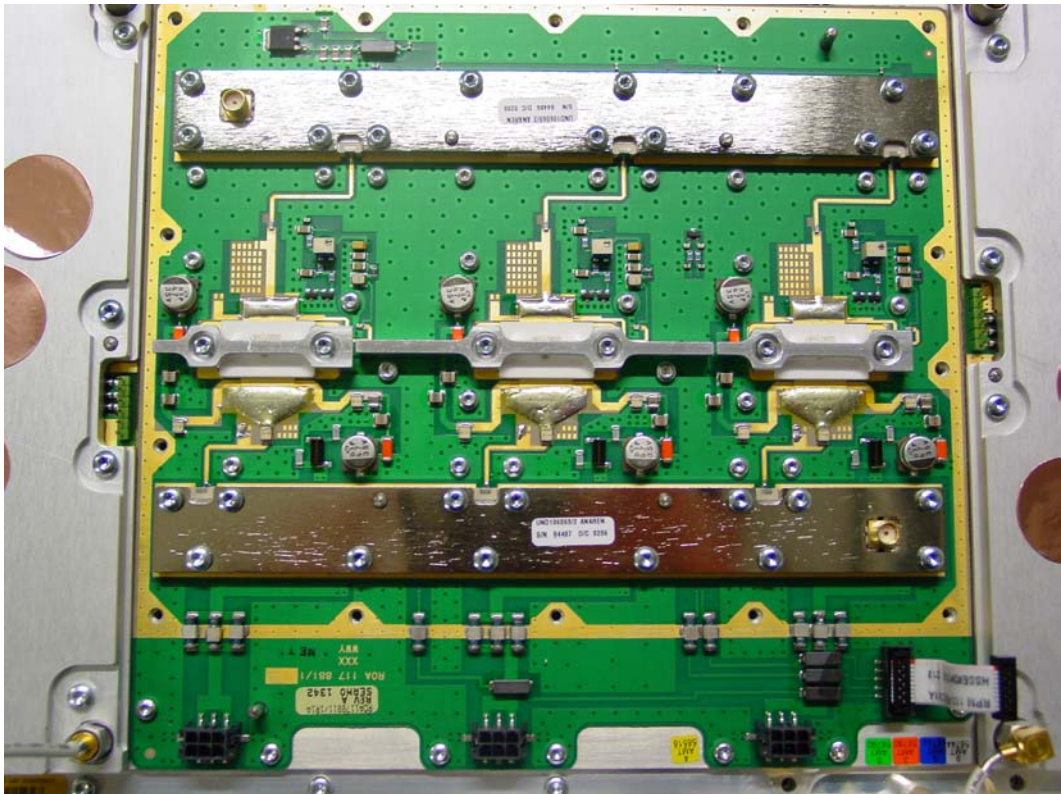
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Power Amplifier Block KRY 901 001/1 with Printed Board MCPA Second Stage
ROA 117 8810/1



Power Amplifier Block KRY 901 001/1 with Printed Board MCPA Third Stage
ROA 117 8811/1



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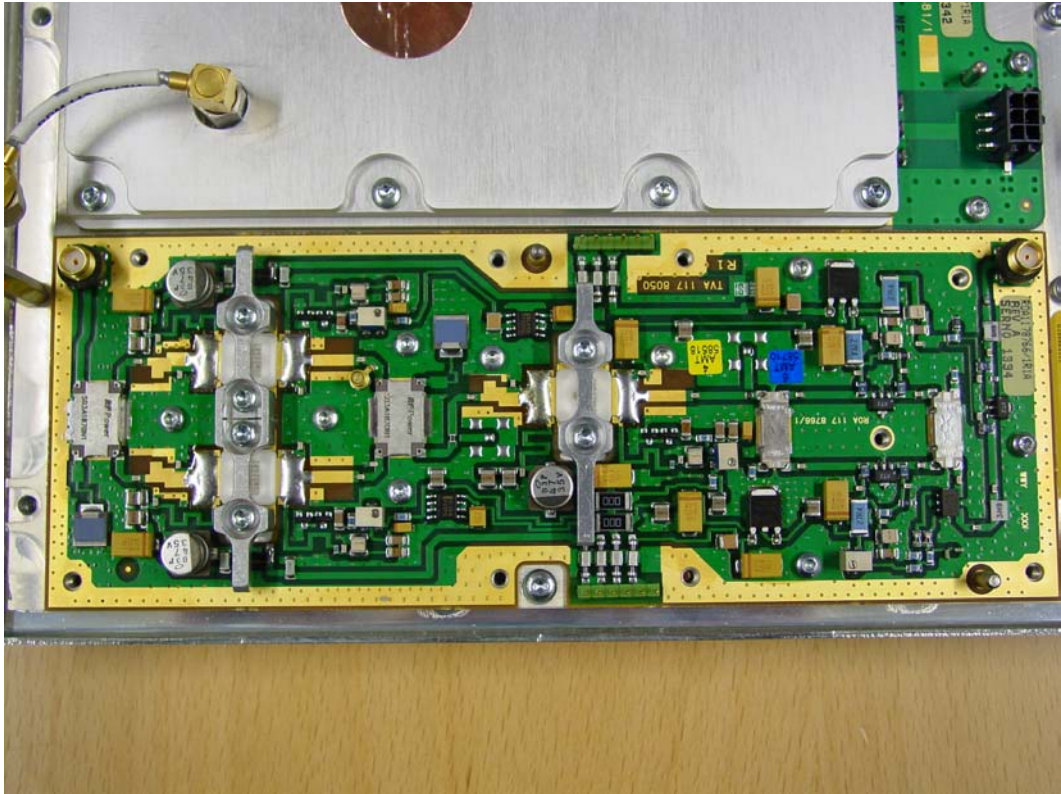
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Power Amplifier Block KRY 901 001/1 with Printed Board MCPA First Stage
ROA 117 8766/1



Sign:.....