SP REPORT
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SWEDAC ACKREDITERING 1002

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Datum/*Date* 2001-06-26
Beteckning/*Reference* F109672-24
Sida/*Page* 1(1)

Equipment Authorization measurements on GSM Base station 1900 MHz with FCC ID:B5KKRC13149-15

Class II Permissive change

(8 enclosures)

Test object

RBS 2202, GSM 1900 equipped with Transceiver Unit KRC 131 49/15, R4G

Summary

Standard	Compliant	Enclosure	Remarks
FCC CFR 47 part 2			
2.1046 RF Power output	Yes	2	
2.1047 Modulation characteristics	N/A	3	
2.1049 Occupied bandwidth	Yes	4	Note 1
2.1051 Spurious emission at antenna	Yes	5	
2.1053 Field strength of spurious radiation	Yes	6	
2.1055 Frequency stability	N/A	7	

Note 1: This unit must use reduced transmit power for the channels adjacent to each frequency block edge

SP Swedish National Testing and Research Institute
EMC

Lasse Bergsten
Deputy Technical Manager

Fredrik Isaksson
Technical Officer

Description - Equipment Under Test (EUT)

Equipment:	GSM Base station transceiver 1900MHz
Tx Frequency range:	1930.2-1989.8 MHz
Tested Channels:	512: 1930.2MHz
	661: 1960.0 MHz
	810: 1989.8 MHz
Product number:	KRC 131 49/15
Serial number:	See Hardware list in enclosure 8
Manufacturer's Representive:	Larry Lindström, Ericsson Radio Systems AB

Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics after a class II permissive change.

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: 2001-05-28

Test witness

Larry Lindström, Ericsson Radio Systems AB (partly)

RF Power output measurements according to 47CFR 2.1046

Date	Temperature	Humidity
2001-06-14	21 °C ± 3 °C	44 % ± 5 %

Test set-up and Procedure

The measurement was made per J-STD-007A Vol 1. 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. Tests were performed on 240 V AC, 24 V DC and –48 V DC supply voltage systems. The transmitter was modulated with 270.8 kbs pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
Boonton RF Peak power meter/analyzer	2001-10	503 144
Power attenuator	2001-08	503 096
Power attenuator	2001-08	503 173
Testo 610, Temperature and humidity meter	2001-10	502 658

Results

Nominal power 240 V AC
Rated output power level (maximum): 45 dBm

Test conditions		Transmitter power (dBm)		
		Channel 512	Channel 661	Channel 810
T_{nom} 21°C	V_{nom} 240 V AC	44.5	44.7	44.5
T_{nom} 21°C	V_{min} 204 V AC	44.5	44.7	44.5
	V_{max} 264 V AC	44.5	44.7	44.5
Variation in output power under normal test conditions (dB)		-0.5	-0.3	-0.5
Measurement uncertainty		0.5 dB		

Note: According to the manufacturer the specified maximum AC voltage limit for RBS 2000 is the nominal +10%. If the base station is exposed to higher voltage than 240 V +10% the fuses in the climate system will trip. If this happens the temperature inside the base station will increase. The temperature of the TRU is supervised and if the TRU temperature will go outside the TRU operating temperature range, the transmitters will be turned off.

Sign:…..

Nominal power 24 V DC
Rated output power level (maximum): 45 dBm

Test conditions		Transmitter power (dBm)		
		Channel 512	Channel 661	Channel 810
T_{nom} 21°C	V_{nom} 24 V AC	44.6	44.9	44.6
T_{nom} 21°C	V_{min} 20.4 V AC	44.6	44.9	44.6
	V_{max} 27.6 V AC	44.6	44.9	44.6
Variation in output power under normal test conditions (dB)		-0.4	-0.1	-0.4
Measurement uncertainty		0.5 dB		

Nominal power -48V DC
Rated output power level (maximum): 45 dBm

Test conditions		Transmitter power (dBm)		
		Channel 512	Channel 661	Channel 810
T_{nom} 21°C	V_{nom} -48 V AC	44.6	44.9	44.6
T_{nom} 21°C	V_{min} –40.8 V AC	44.6	44.9	44.6
	V_{max} -55.2 V AC	44.6	44.9	44.6
Variation in output power under normal test conditions (dB)		-0.4	-0.1	-0.4
Measurement uncertainty		0.5 dB		

Limits

The tolerance of the maximum rated output power shall not be grater than ?2 dB.

Complies?	Yes

Sign:…..

Modulation characteristics measurements according to 47CFR 2.1047

Date	Temperature	Humidity
-	- °C ± 3 °C	- % ± 5 %

No measurements were done.

Sign:…..

Occupied bandwidth measurements according to 47CFR 2.1049

Date	Temperature	Humidity
2001-06-14	21 °C ± 3 °C	44 % ± 5 %

Test set-up and Procedure

The measurement was made per J-STD-007A Vol 1. The output was connected to a spectrum analyser. The spectrum analyser was hooked up to a external 10 MHz reference standard during the measurements. The transmitter was modulated with 270.8 kbs pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S ESI 40 with option FSE-B7	2001-07	503 125
Power attenuator	2001-08	503 096
Power attenuator	2001-08	503 173
Testo 610, Temperat ure and humidity meter	2001-10	502 658

Measurement uncertainty: 3.7 dB

Results

Diagram 1 Ch 512 OBW Reference level - 39 dBm output power
Diagram 2 Ch 512 OBW 26 dB points - 39 dBm output power
Diagram 3 Ch 512 OBW Band edge - 39 dBm output power

Diagram 4 Ch 513 OBW Reference level - 45 dBm output power
Diagram 5 Ch 513 OBW 26 dB points - 45 dBm output power
Diagram 6 Ch 513 OBW Band edge - 45 dBm output power

Diagram 7 Ch 810 OBW Reference level - 39 dBm output power
Diagram 8 Ch 810 OBW 26 dB points - 39 dBm output power
Diagram 9 Ch 810 OBW Band edge - 39 dBm output power

Diagram 10 Ch 809 OBW Reference level - 45 dBm output power
Diagram 11 Ch 809 OBW 26 dB points - 45 dBm output power
Diagram 12 Ch 809 OBW Band edge - 45 dBm output power

Remarks

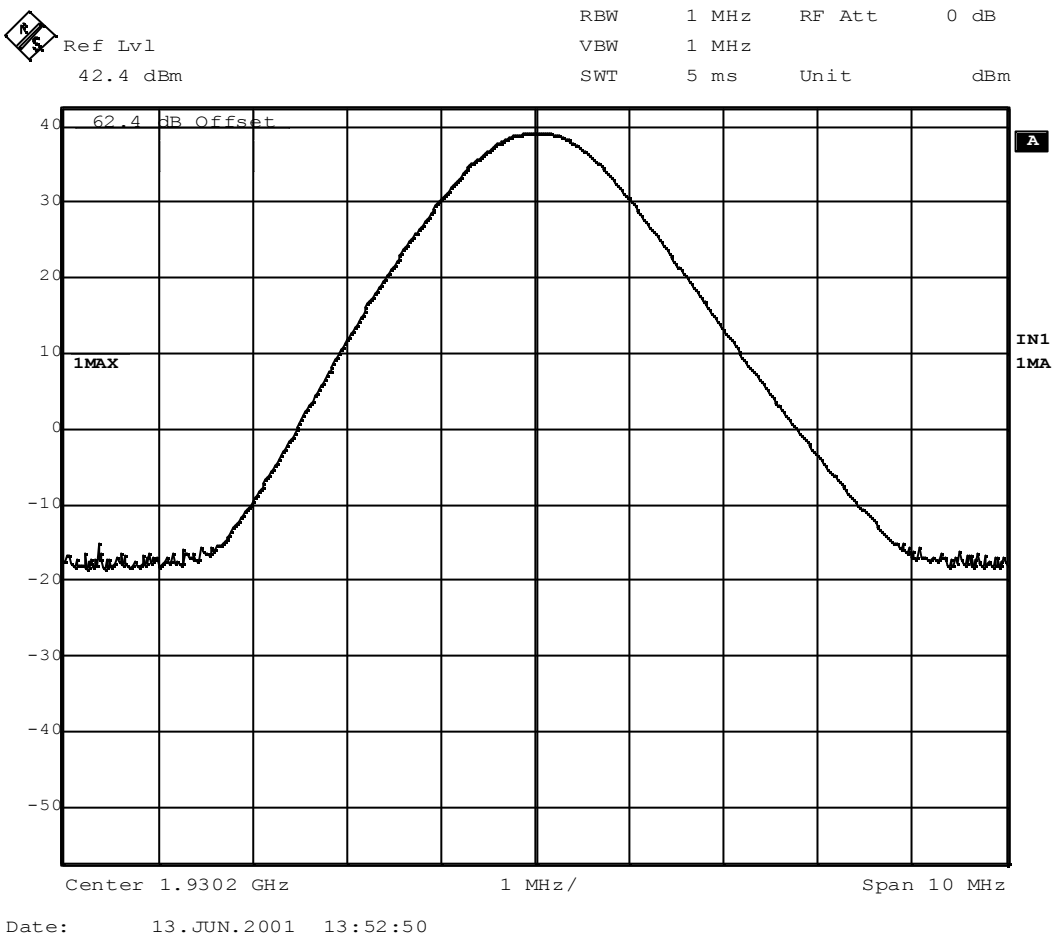
This unit must use reduced transmit power for the channels adjacent to each frequency block edge.

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

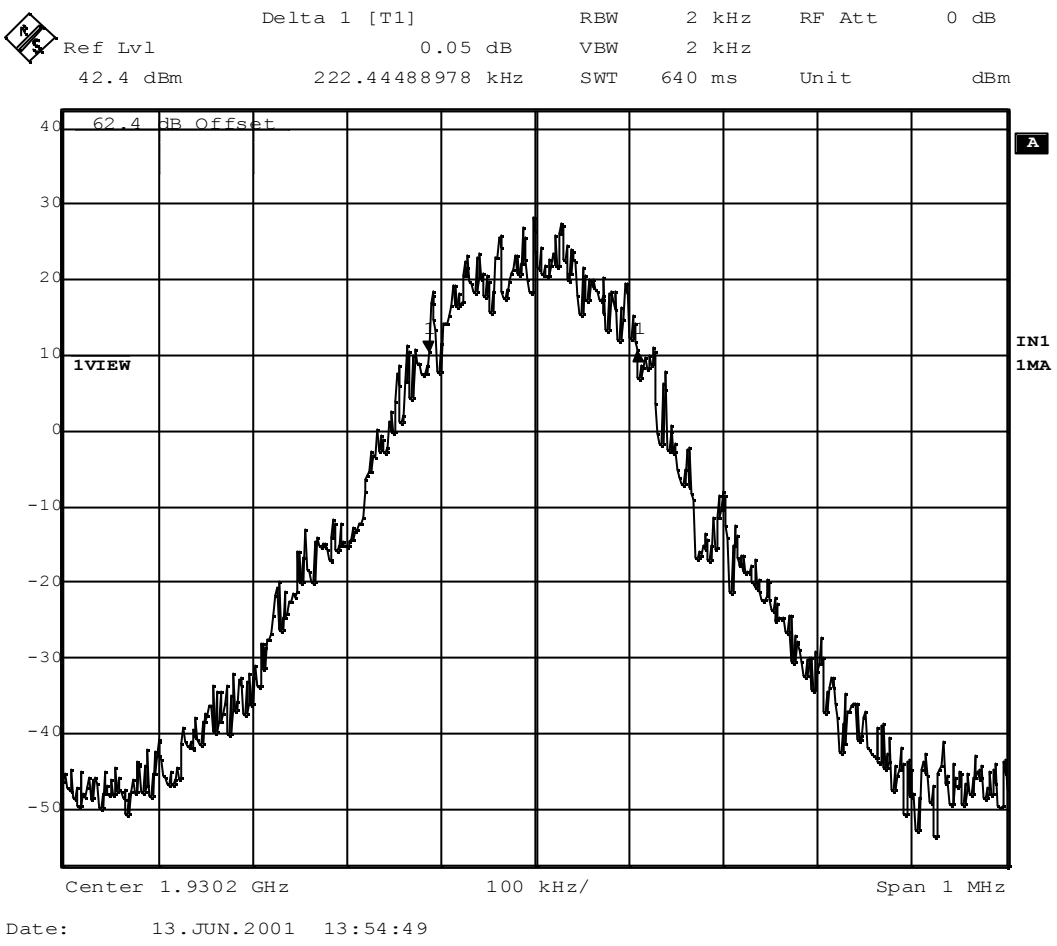
Reference level



Ch 512 - 39 dBm

Sign:…..

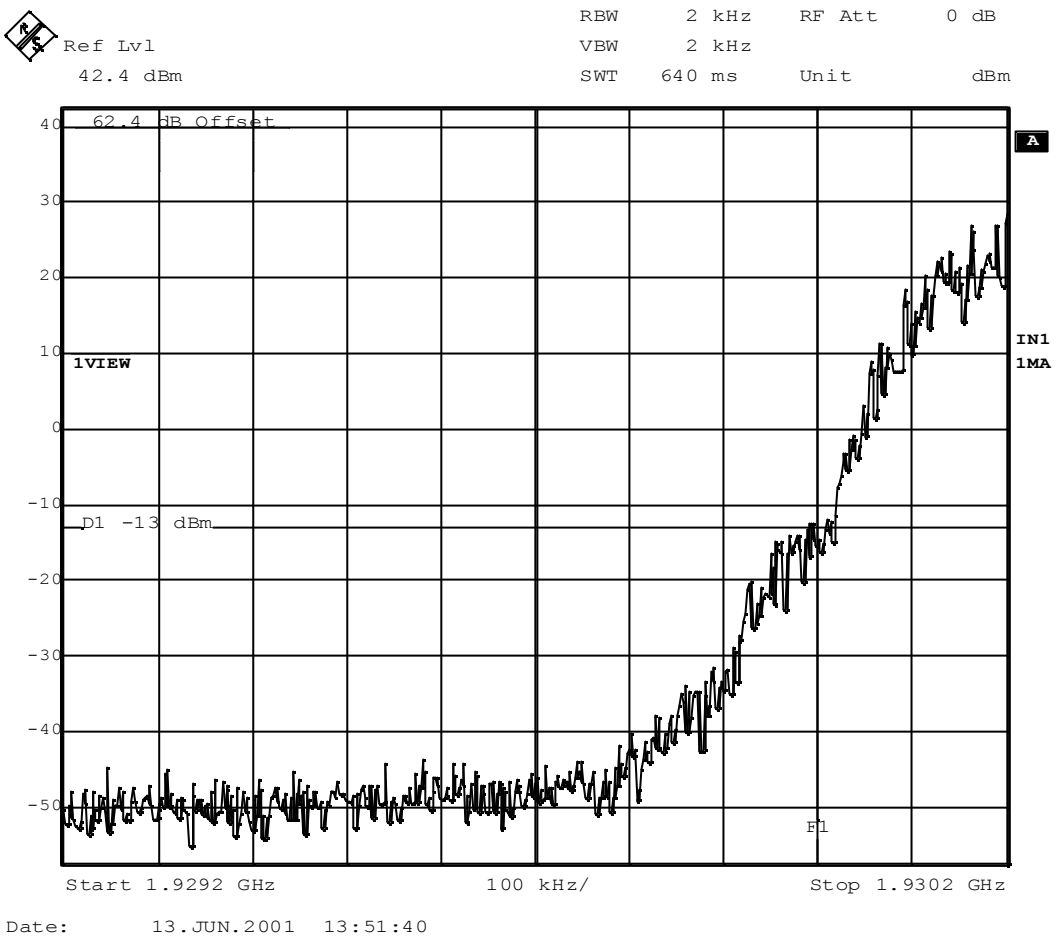
26 dB point



Ch 512 - 39 dBm

Sign:…..

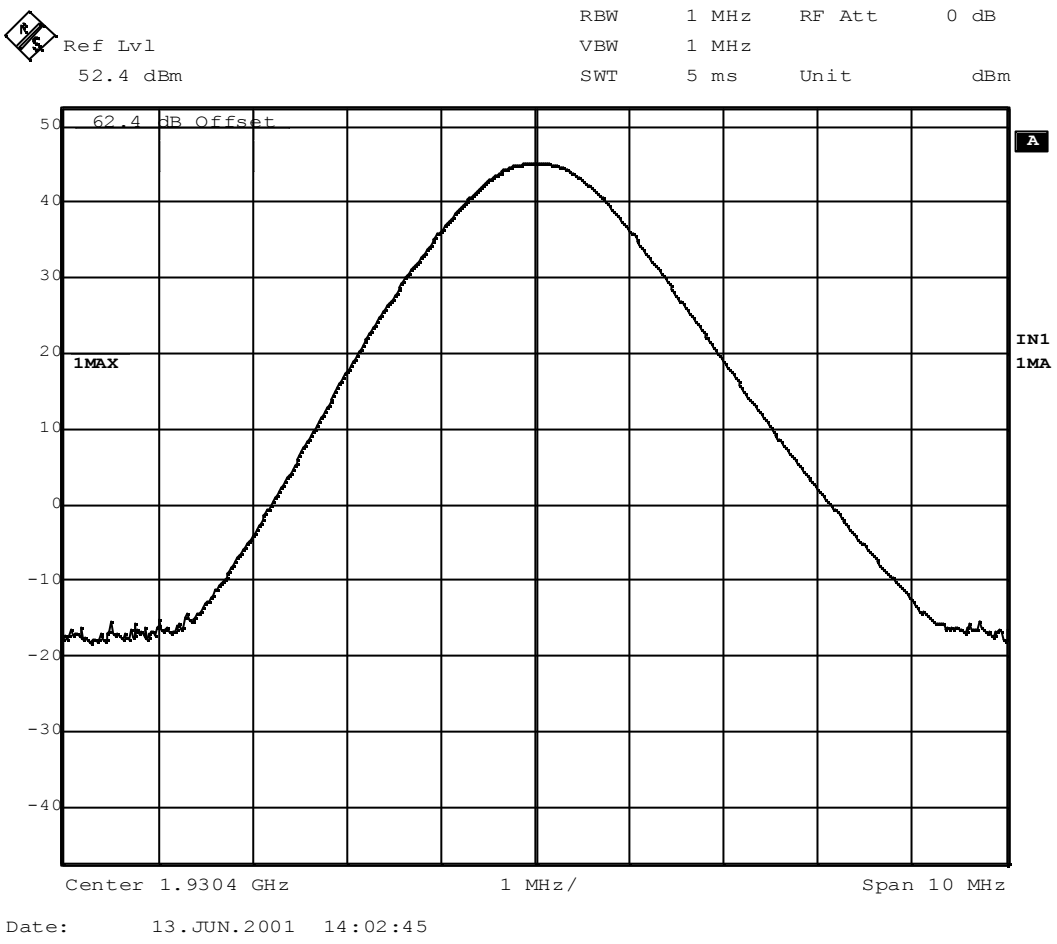
Band edge level



Ch 512 - 39 dBm

Sign:…..

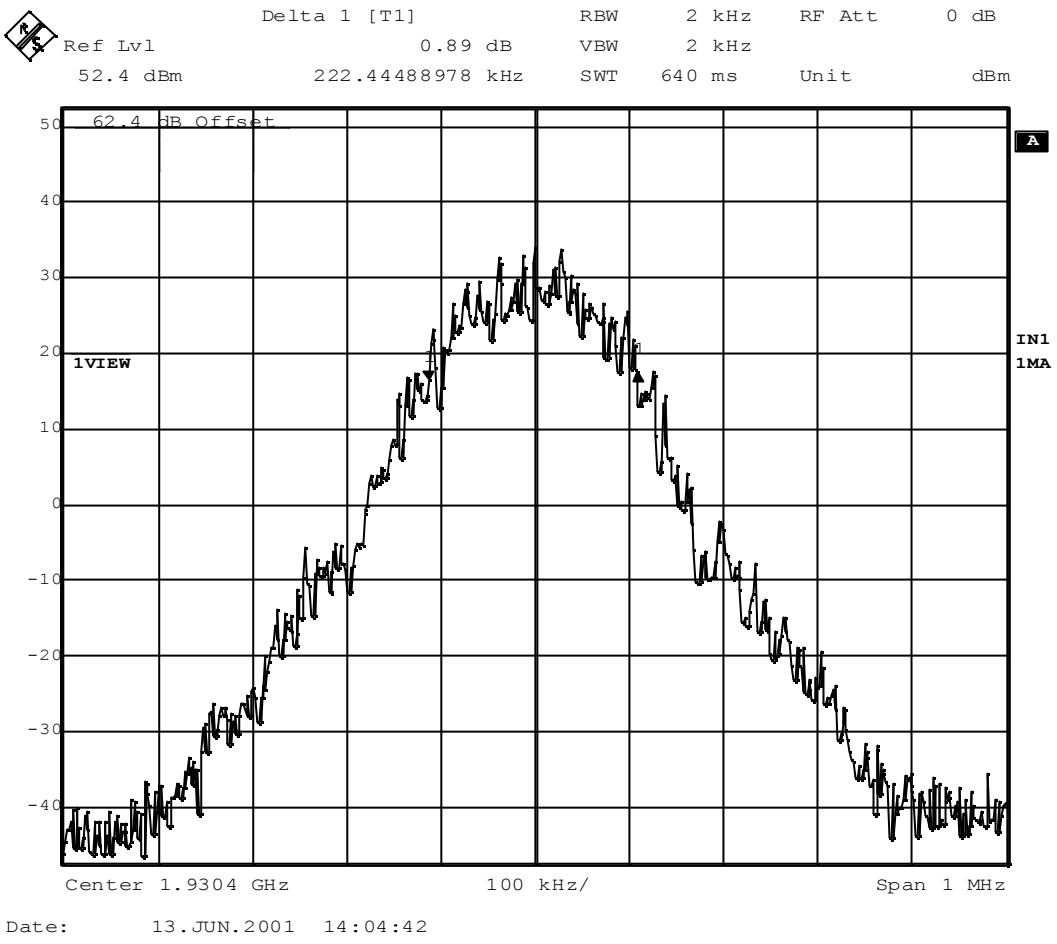
Reference level



Ch 513 - 45 dBm

Sign:…..

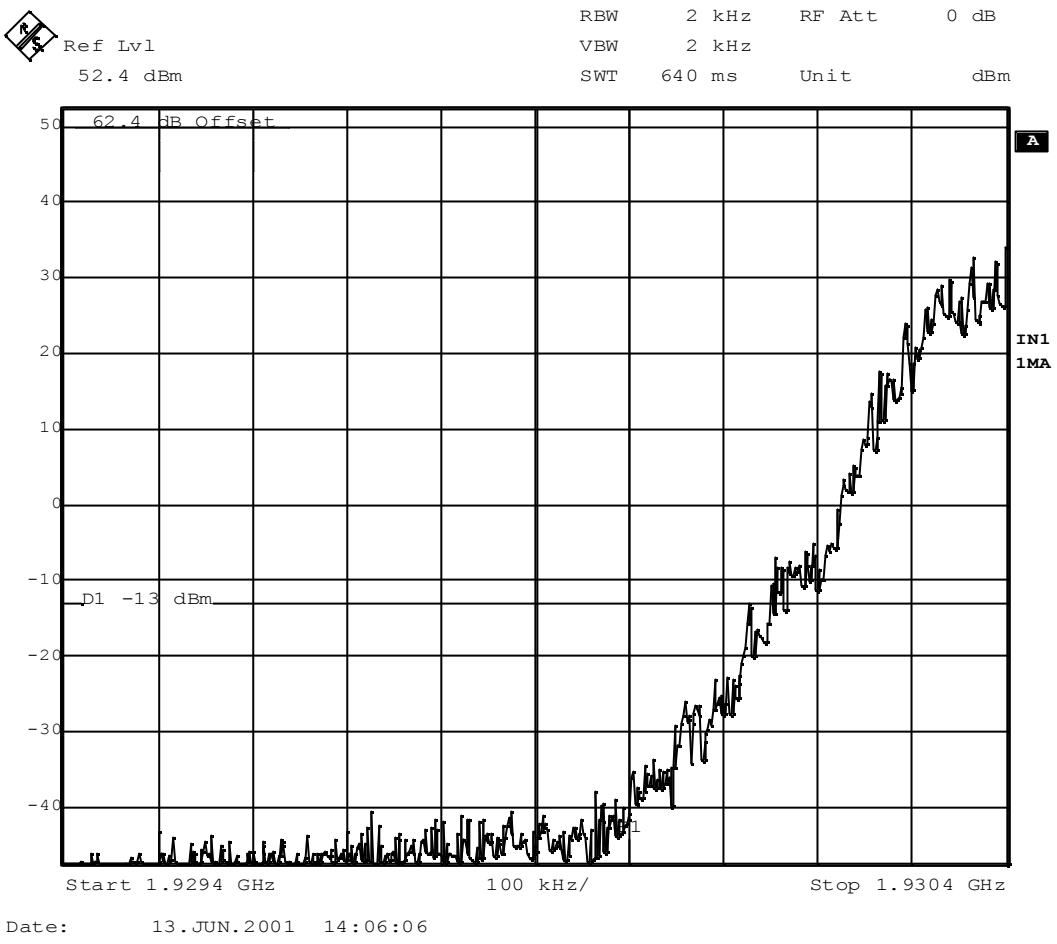
26 dB point



Ch 513 - 45 dBm

Sign:…..

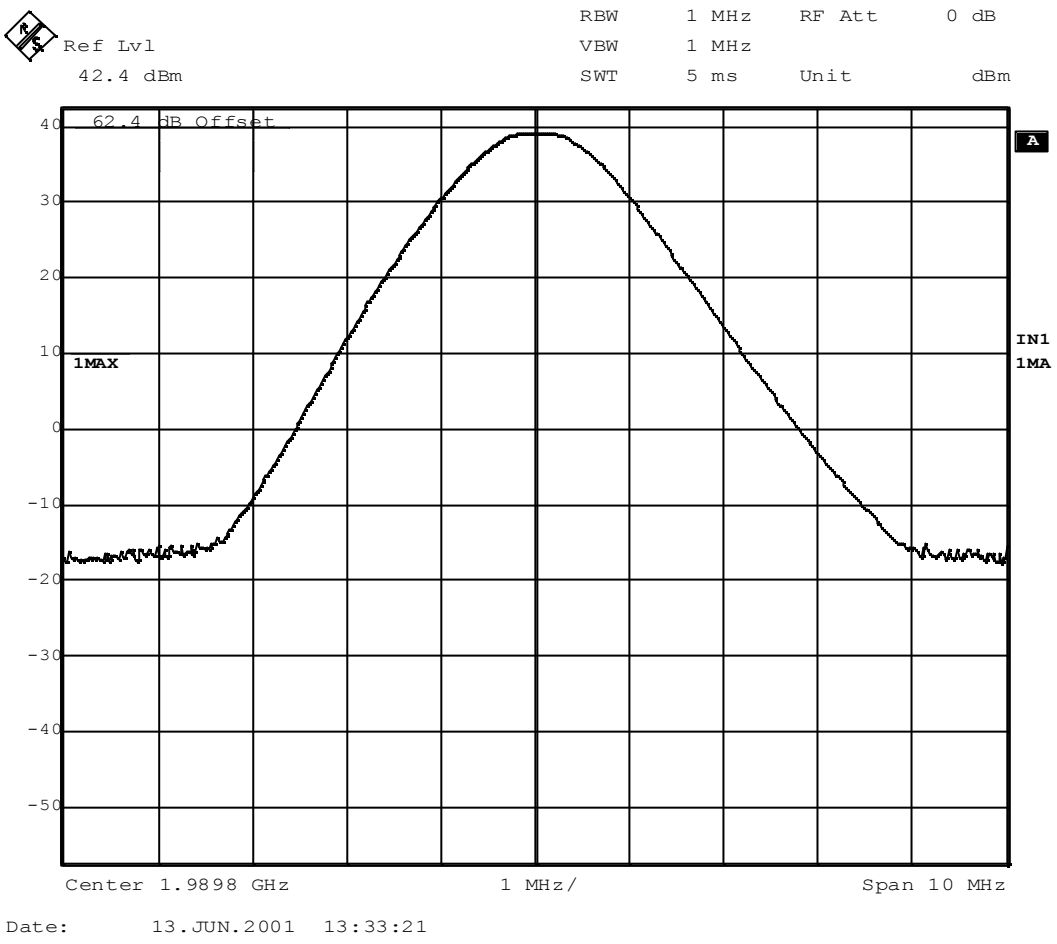
Band edge level



Ch 513 - 45 dBm

Sign:…..

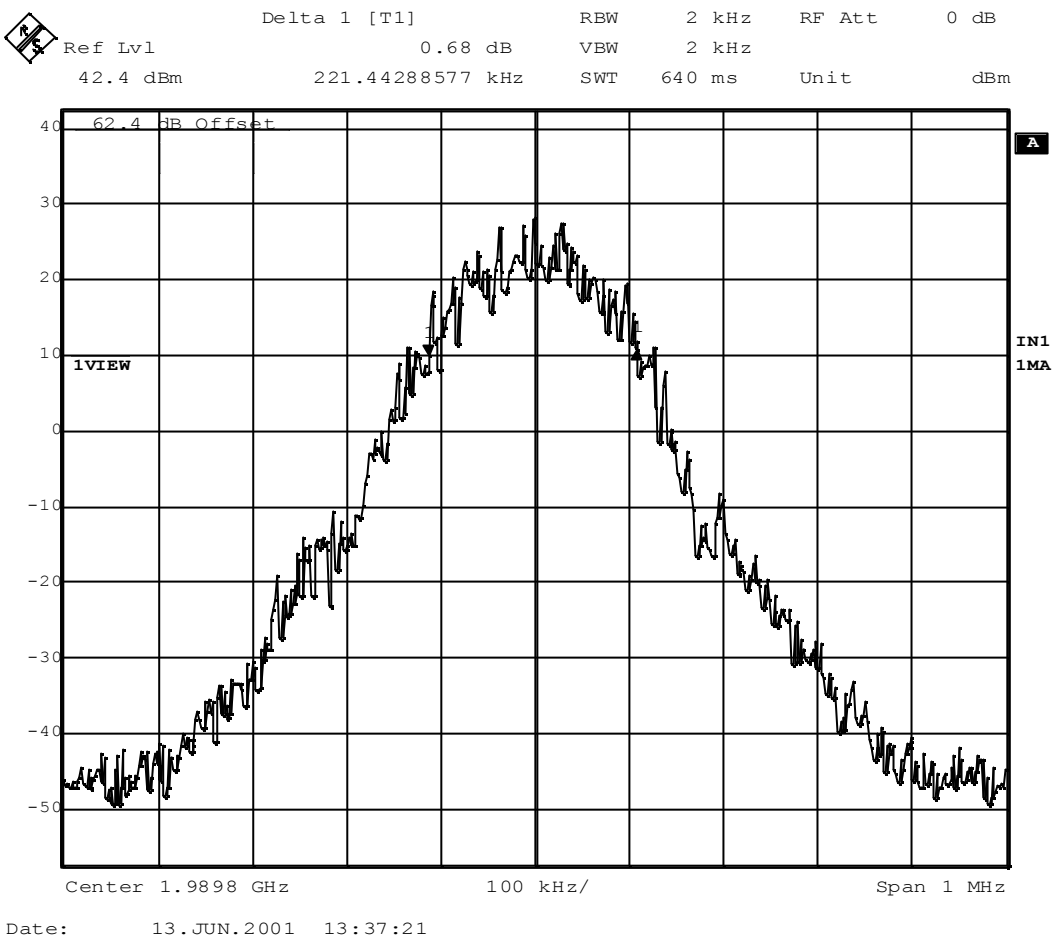
Reference level



Ch 810 - 39 dBm

Sign:…..

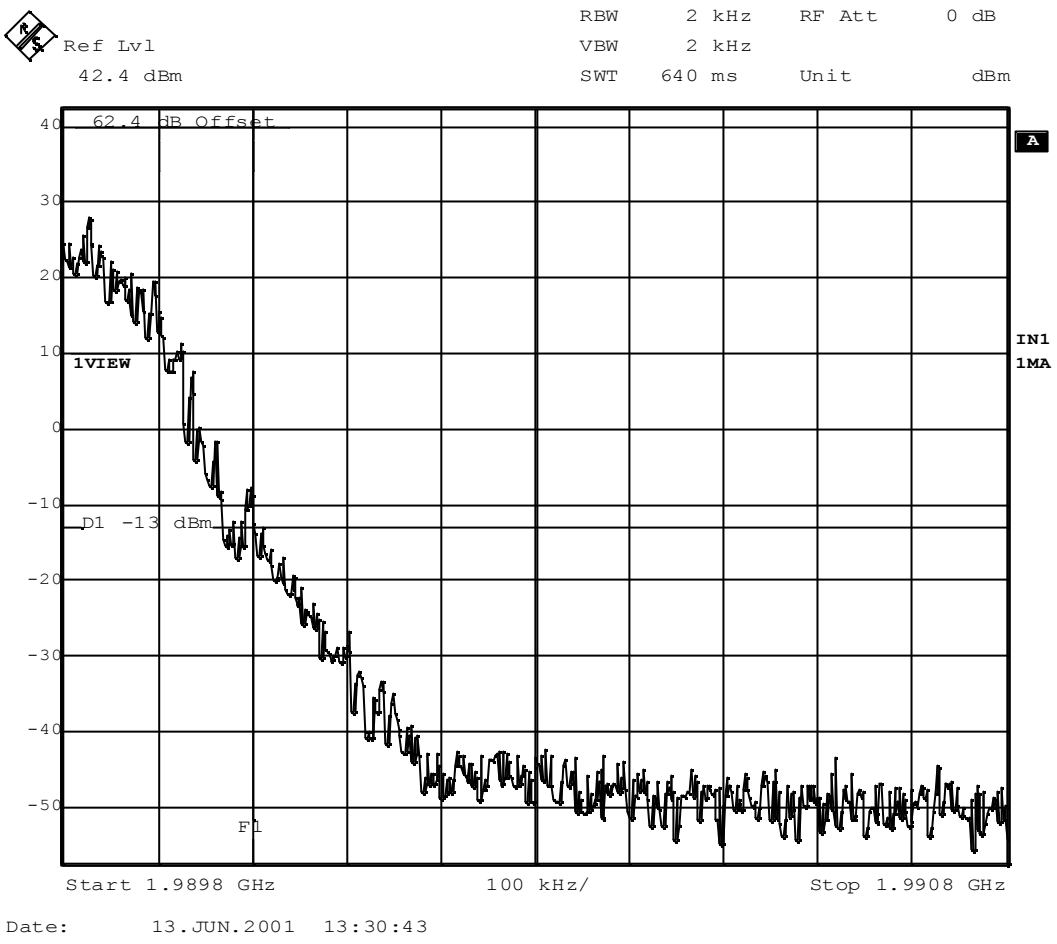
26 dB point



Ch 810 - 39 dBm

Sign:…..

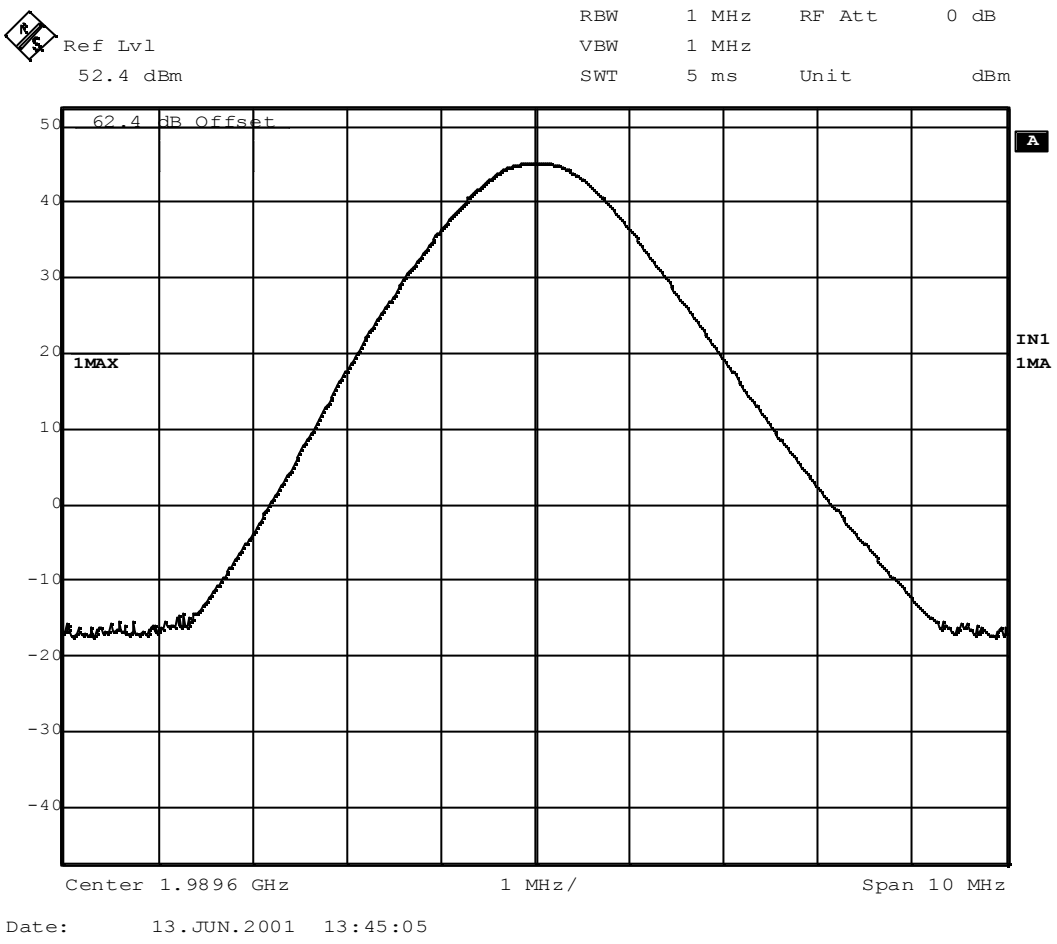
Band edge level



Ch 810 - 39 dBm

Sign:…..

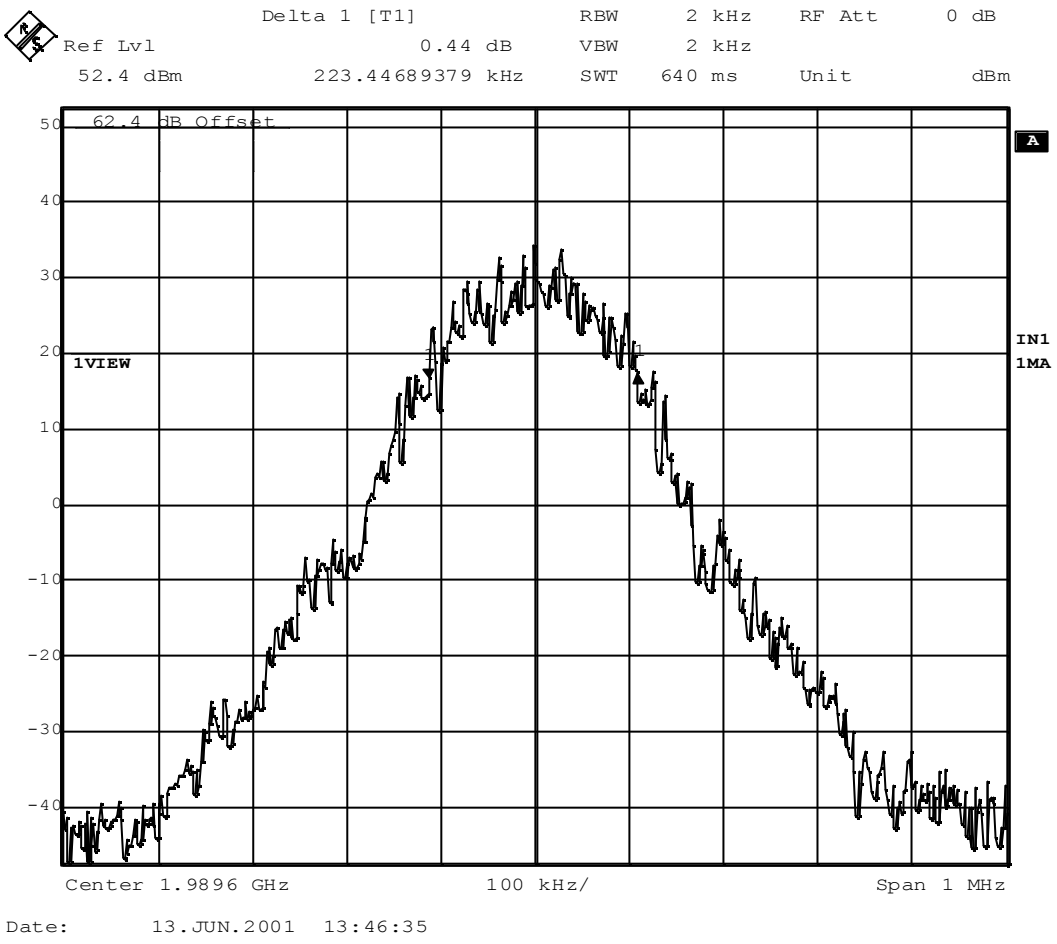
Reference level



Ch 809 - 45 dBm

Sign:…..

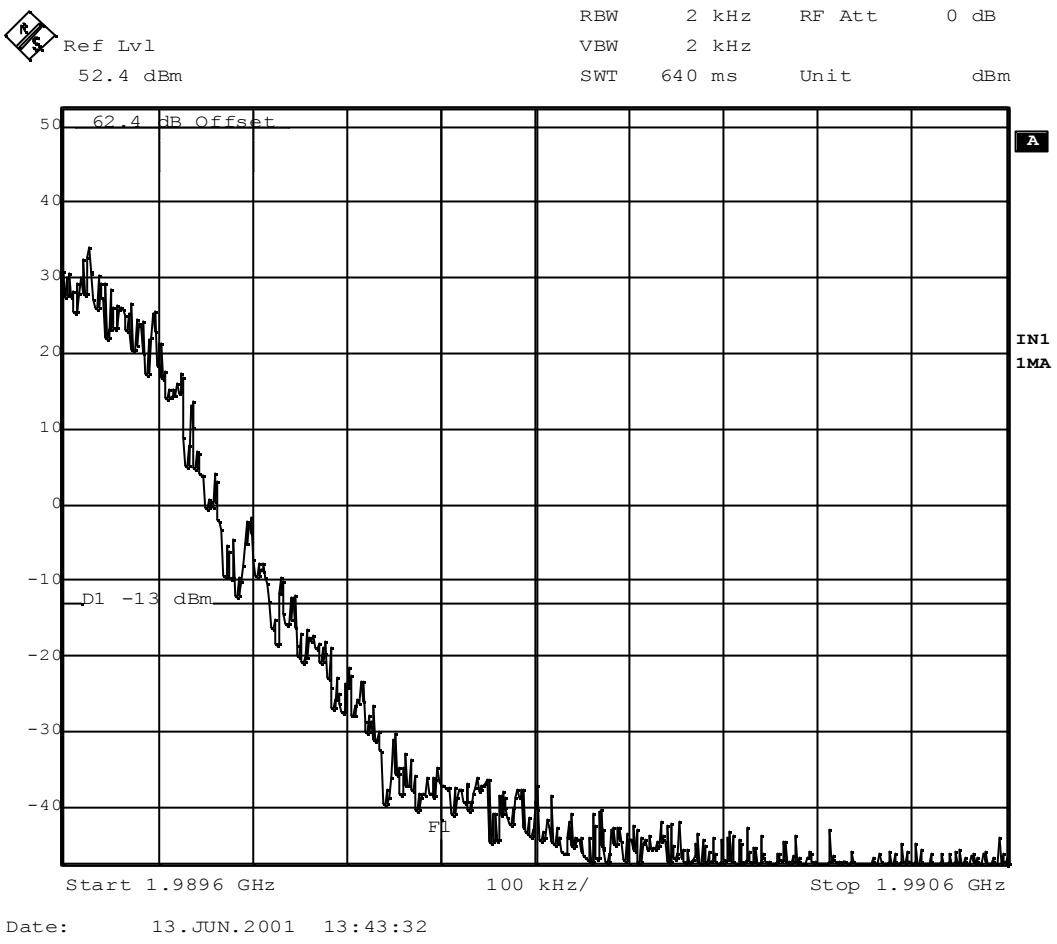
26 dB point



Ch 809 - 45 dBm

Sign:…..

Band edge level



Ch 809 - 45 dBm

Sign:…..

Conducted spurioius emission measurements according to 47CFR 2.1051

Date	Temperature	Humidity
2001-06-12	20 °C ± 3 °C	37 % ± 5 %

Test set-up and Procedure

The measurement was made per J-STD-007A Vol 1. The output was connected to a spectrum analyser. The spectrum analyser was hooked up to a external 10 MHz reference standard during the measurements. The transmitter was modulated with 270.8 kbs pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S ESI 40 with option FSE-B7	2001-07	503 125
Power attenuator	2001-08	503 096
Power attenuator	2001-08	503 173
Testo 610, Temperature and humidity meter	2001-10	502 658

Measurement uncertainty: 3.7 dB

Results

Diagram 1 Ch 512
Diagram 2 Ch 810

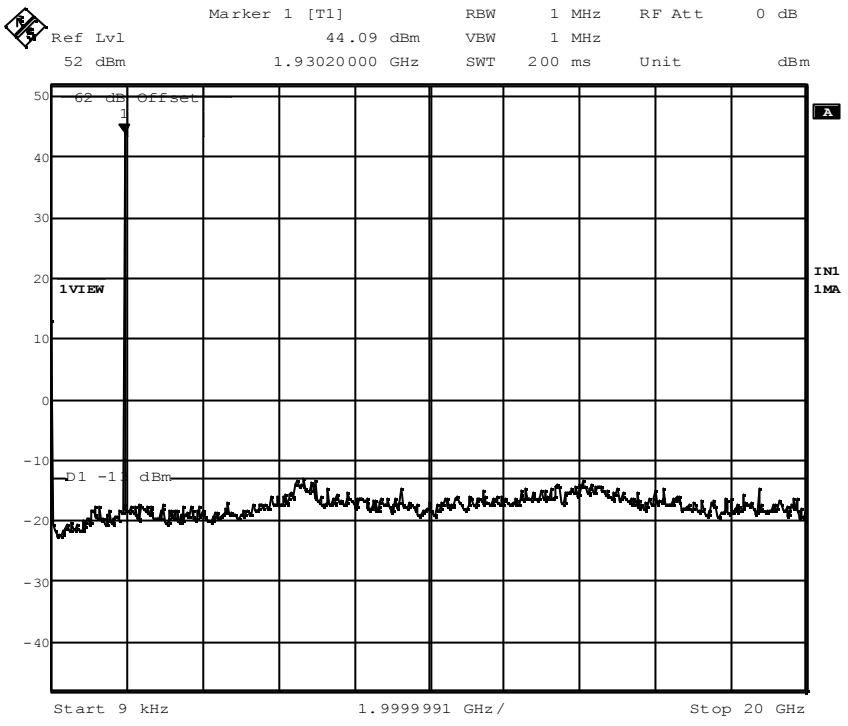
Limits

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.

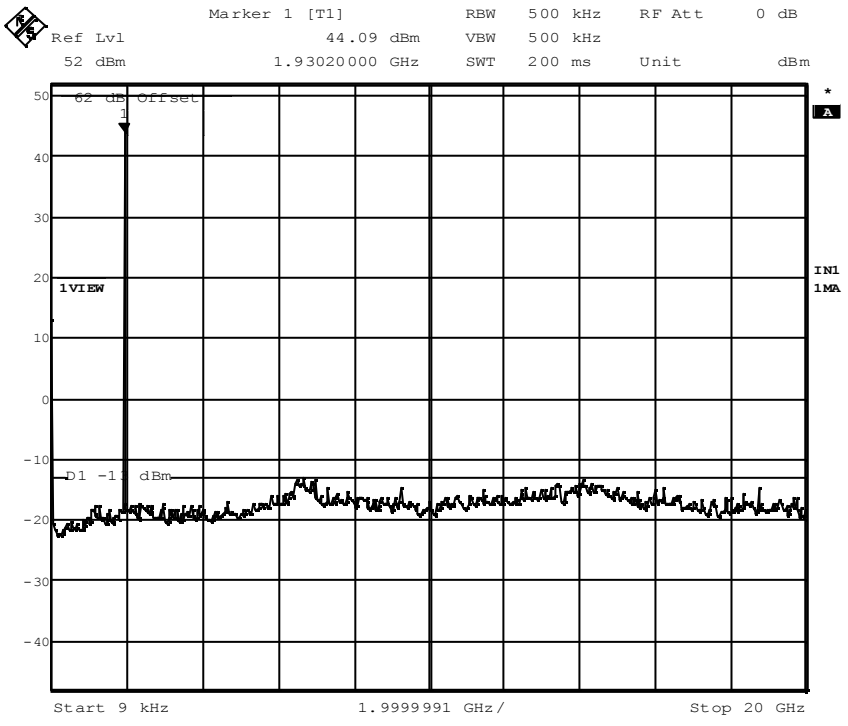
Complies?	Yes

Sign:…..

Ch 512 – 45 dBm



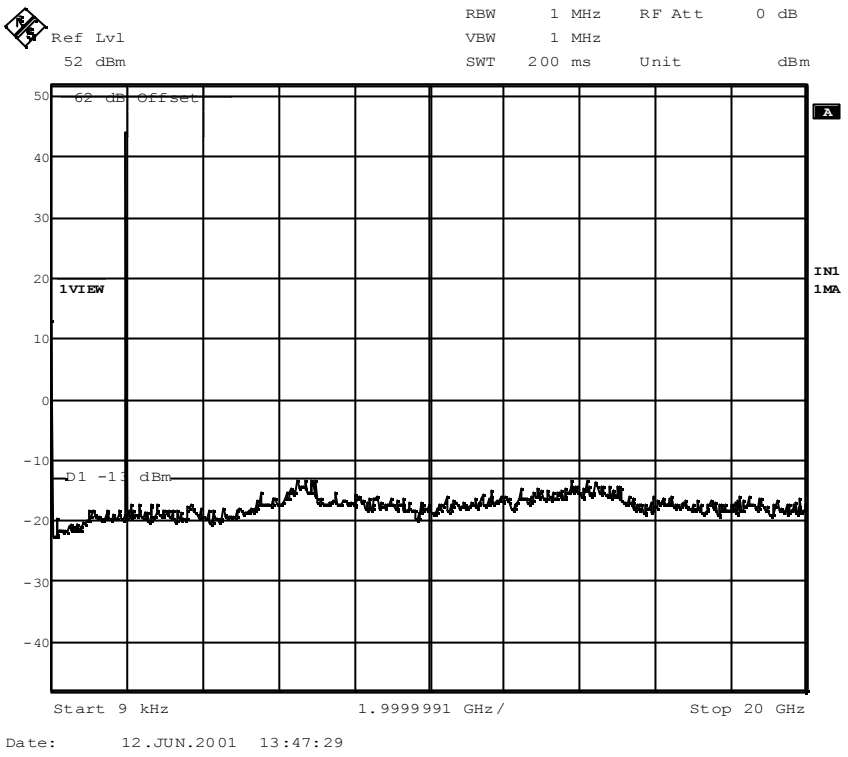
RBW: 1 MHz



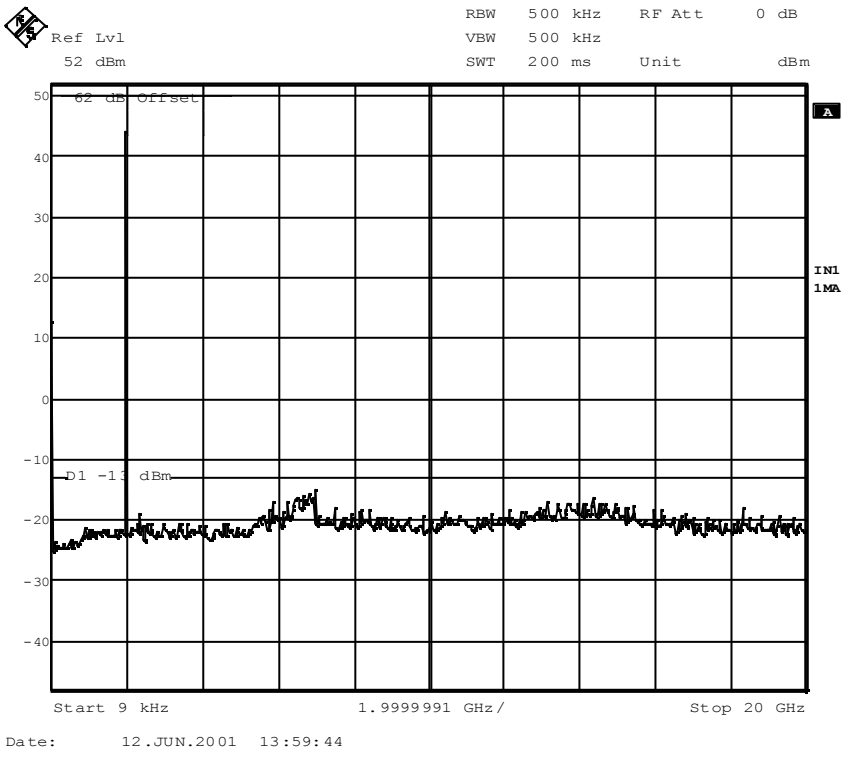
RBW: 500 kHz

Sign:…..

Ch 810 – 45 dBm



RBW: 1 MHz



RBW: 500 kHz

Sign:…..

Field strength of spurious radiation measurements according to 47CFR 2.1053

Date	Temperature	Humidity
2001-06-08	21 °C ± 3 °C	35 % ± 5 %

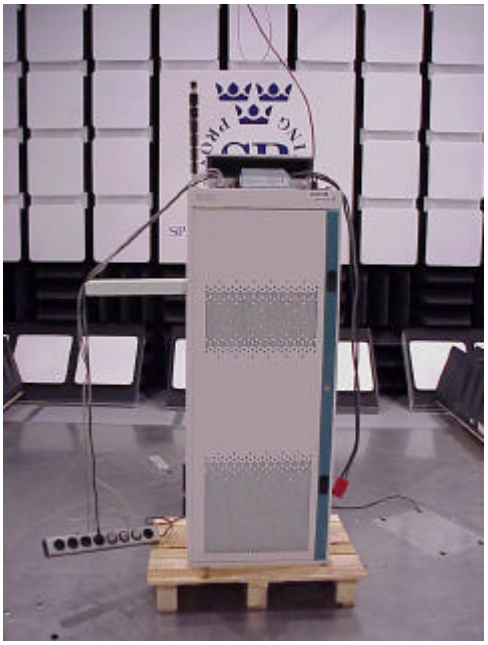
Test set-up and Procedure

The measurement procedure is per ANSI/TIA/EIA-603-1992. The substitution measurements were performed in a anechoic chamber. The chamber is listed at FCC, Columbia with registration number: 93866. Measurements were done at 3 m distance in the frequency range 9kHz-18GHz and at 1 m in the range 18-20GHz. Tests were performed on 240 V AC, 24 V DC and –48 V DC supply voltage systems. The transmitter was modulated with 270.8 kbs pseudorandom data during the measurements.

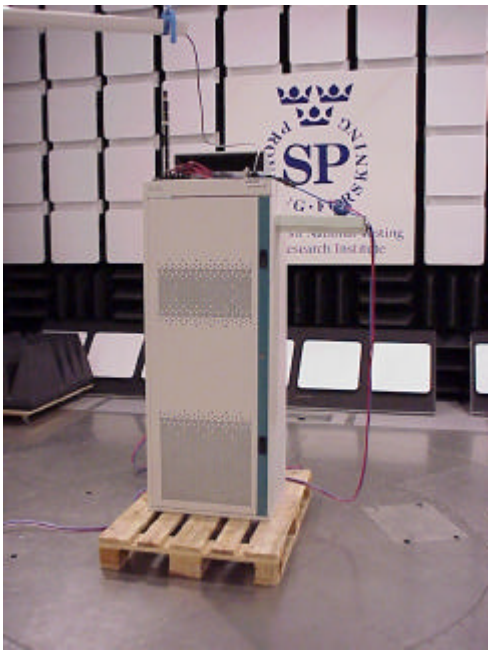
Measurement equipment	Calibration Due	SP number
Anechoic chamber	-	15:115
R&S ESI 26	2001-09	503 292
Control computer	-	503 479
Software: R&S ES-K1, ver. 1.60	-	-
Chase Bilog antenna CBL 6111A	2002-02	503 182
Schwarzbeck Precision dipole	2001-12	500 592
Schwarzbeck Precision dipole	2001-12	500 594
EMCO loop antenna 6502	2001-07	502 916
EMCO Horn Antenna 3115	2001-09	502 175
EMCO Horn Antenna 3115	2001-09	501 548
EMCO Horn Antenna 3116	2002-04	503 279
MITEQ Low Noise Amplifier	2001-05	503 277
R&S Digital signal generator SME06	2001-05	502 755
Testo 610, Temperature and humidity meter	2001-10	502 658

The test set-up during the substitution measurement can be seen in the pictures below.

24 V DC/ 240 V AC



-48 V DC



Results

Nominal Voltage 240 V AC
45 dBm output power

Frequency (MHz)	Spurious emission level (dBm)			
	Ch 512		Ch 810	
	Vertical	Horizontal	Vertical	Horizontal
0.050-1000	All emission > 20 dB below limit		All emission > 20 dB below limit	
1000-20000	All emission > 20 dB below limit		All emission > 20 dB below limit	
Measurement uncertainty			4.7dB	

Nominal Voltage 24 V DC
45 dBm output power

Frequency (MHz)	Spurious emission level (dBm)			
	Ch 512		Ch 810	
	Vertical	Horizontal	Vertical	Horizontal
0.059	-31			
0.050-1000	All emission > 20 dB below limit		All emission > 20 dB below limit	
1000-20000	All emission > 20 dB below limit		All emission > 20 dB below limit	
Measurement uncertainty			4.7dB	

Nominal Voltage –48 V DC
45 dBm output power

Frequency (MHz)	Spurious emission level (dBm)			
	Ch 512		Ch 810	
	Vertical	Horizontal	Vertical	Horizontal
0.061	-30			
0.050-1000	All emission > 20 dB below limit		All emission > 20 dB below limit	
1000-20000	All emission > 20 dB below limit		All emission > 20 dB below limit	
Measurement uncertainty			4.7dB	

Note: According to the manufacturer the lowest generated frequency in the EUT is 50 kHz.

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

Sign:…..

Frequency stability measurements according to 47CFR 2.1055

Date	Temperature	Humidity
-	- °C ± 3 °C	- % ± 5 %

No measurements were done.

Sign:…..

EUT Hardware configuration list RBS 2202

-48 Volt DC system

Unit	Product Number	Serial Number	Revision
Cabinet	SEB 112 1024/02	A533824938	R3E
DXU	BOE 602 02/03	A101008680	R5A
ECU	BMP 903 021/1	A081417070	R7C
PSU -48 (1)	BMR 960 013/1	A081872846	R10A
PSU -48 (1)	BMR 960 013/1	A081872847	R10A
PSU -48 (1)	BMR 960 013/1	A081872887	R10A
PSU -48 (1)	BMR 960 013/1	A081872845	R10A
TRU 1900	KRC 131 49/15	A533798218	R4G
TRU 1900	KRC 131 49/15	A533798225	R4G
TRU 1900	KRC 131 49/15	A533798227	R4G
TRU 1900	KRC 131 49/15	A533798221	R4G
TRU 1900	KRC 131 49/15	A533798223	R4G
TRU 1900	KRC 131 49/15	A533798234	R4G
CDU-A 1900	BFL 119 108/1	T049409027	R6E
CDU-A 1900	BFL 119 108/1	T049409020	R6E
CDU-A 1900	BFL 119 108/1	T049409030	R6E

24Volt DC/240 Volt AC system

Unit	Product Number	Serial Number	Revision
Cabinet	SEB 112 1024/01	A533827603	R3F
DXU	BOE 602 02/03	A101047182	R5A
ECU	BMP 903 021/1	A081417056	R7C
PSU 230	BML 231 201/1	A081378732	R11A
PSU 230	BML 231 201/1	A081376250	R11A
PSU 230	BML 231 201/1	A081378730	R11A
PSU 230	BML 231 201/1	A081378733	R11A
TRU 1900	KRC 131 49/15	A533798218	R4G
TRU 1900	KRC 131 49/15	A533798225	R4G
TRU 1900	KRC 131 49/15	A533798227	R4G
TRU 1900	KRC 131 49/15	A533798221	R4G
TRU 1900	KRC 131 49/15	A533798223	R4G
TRU 1900	KRC 131 49/15	A533798234	R4G
CDU-A 1900	BFL 119 108/1	T049409018	R6E
CDU-A 1900	BFL 119 108/1	T049409010	R6E
CDU-A 1900	BFL 119 108/1	T049409014	R6E

Software	Revision
DXU	DXL R048M
TRU	TRL 048M
ECU	ECLR 048M

Description of EUT

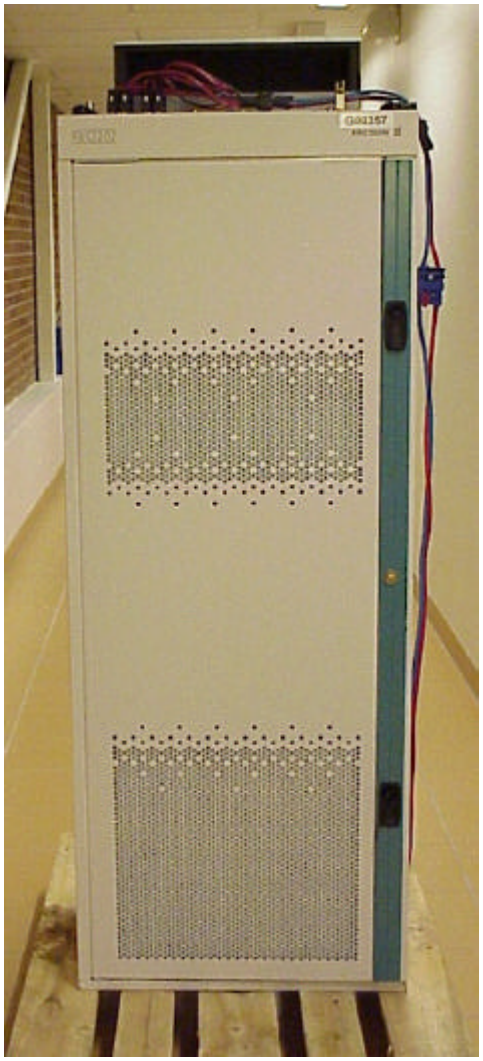
The EUT is a 1900 MHz GSM Base station configured with 6 transceiver units that are designed to provide mobile telephone users with a connection to a mobile network or the PSTN.

Sign:…..

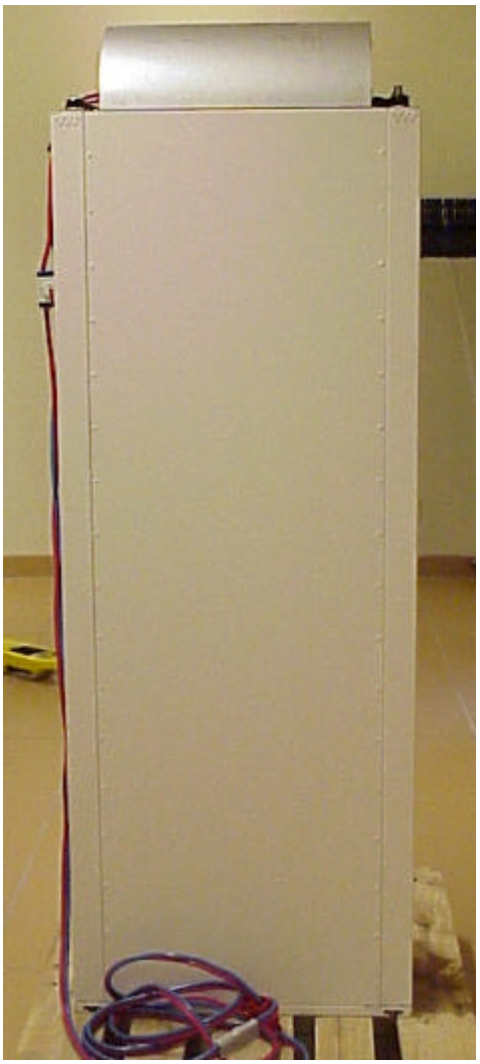
Photos

RBS 2202 -48 Volt DC system

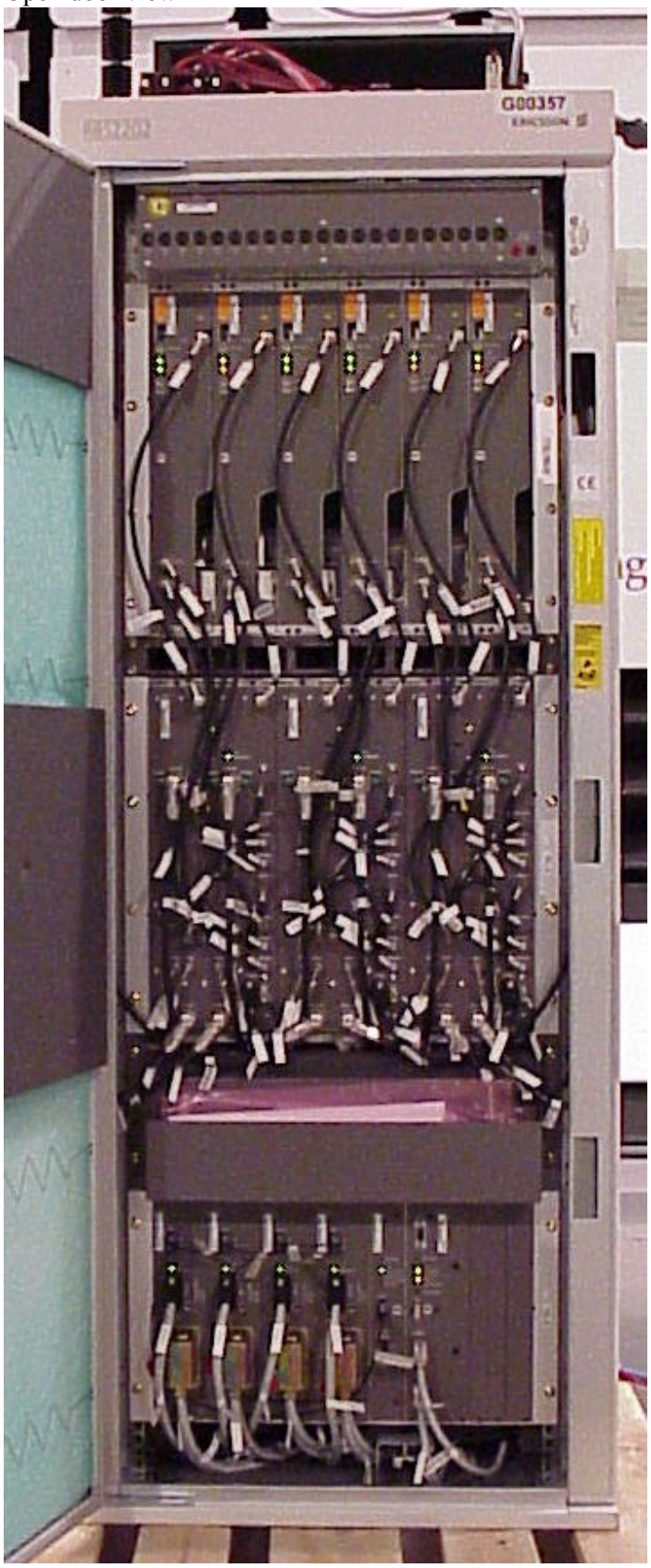
Front view



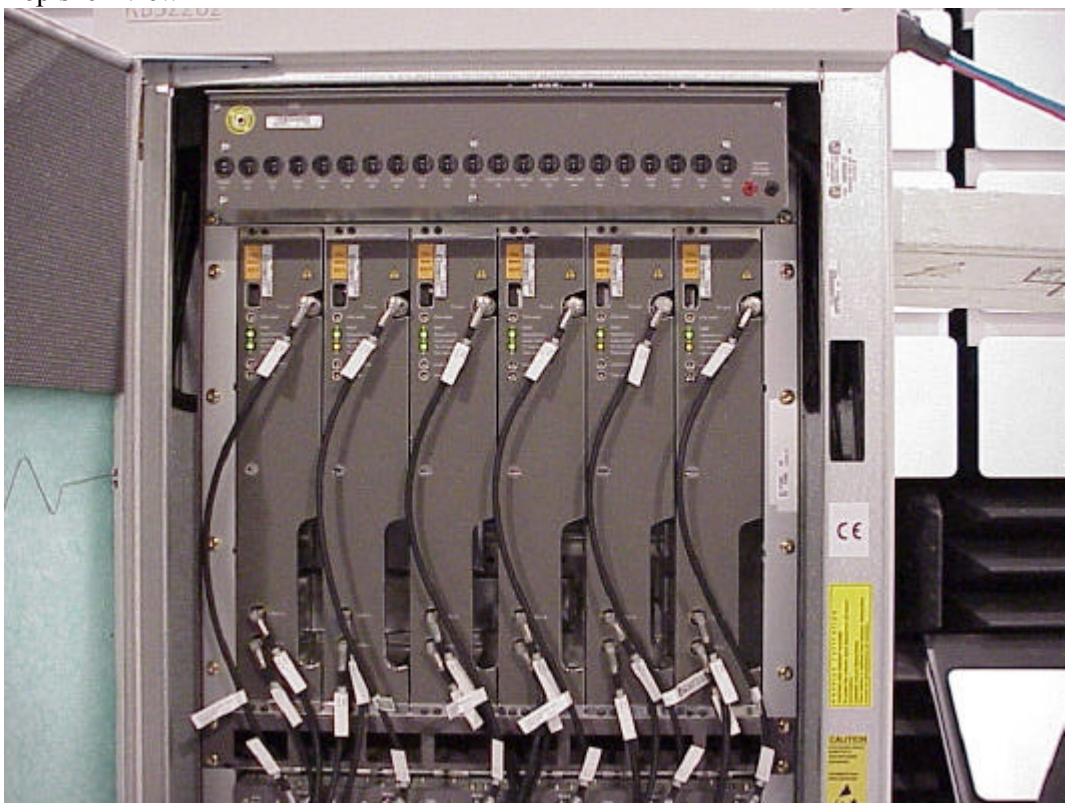
Rear side



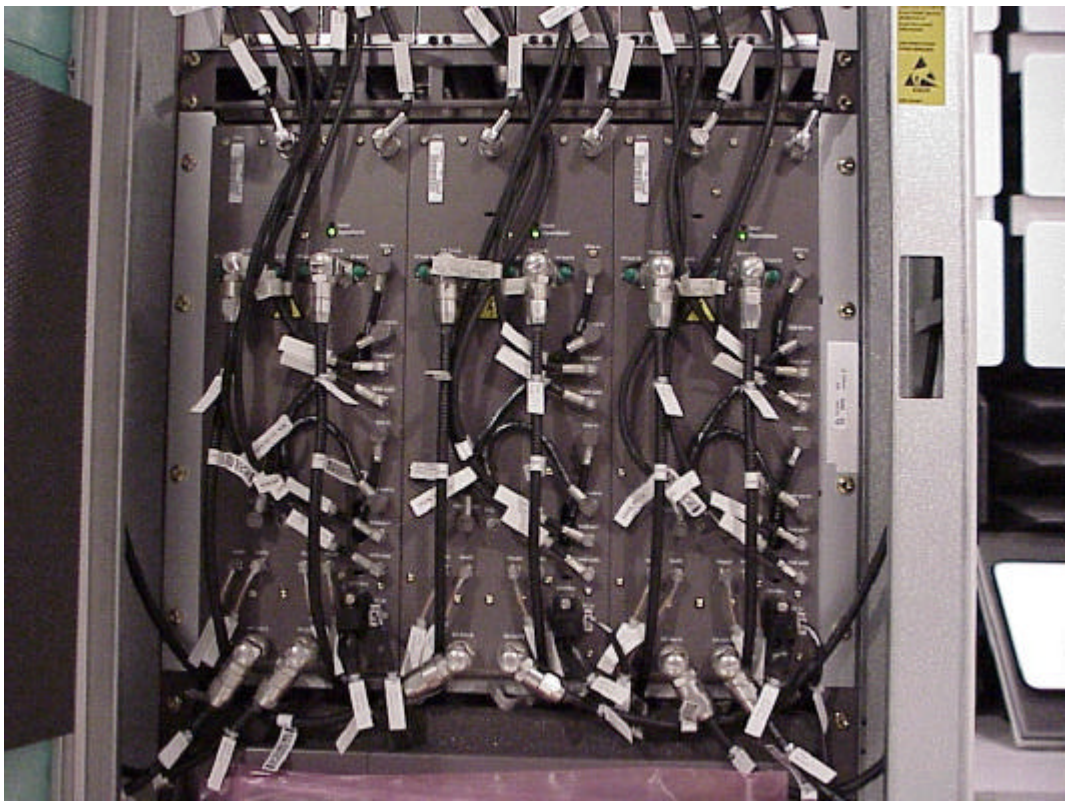
Open door view



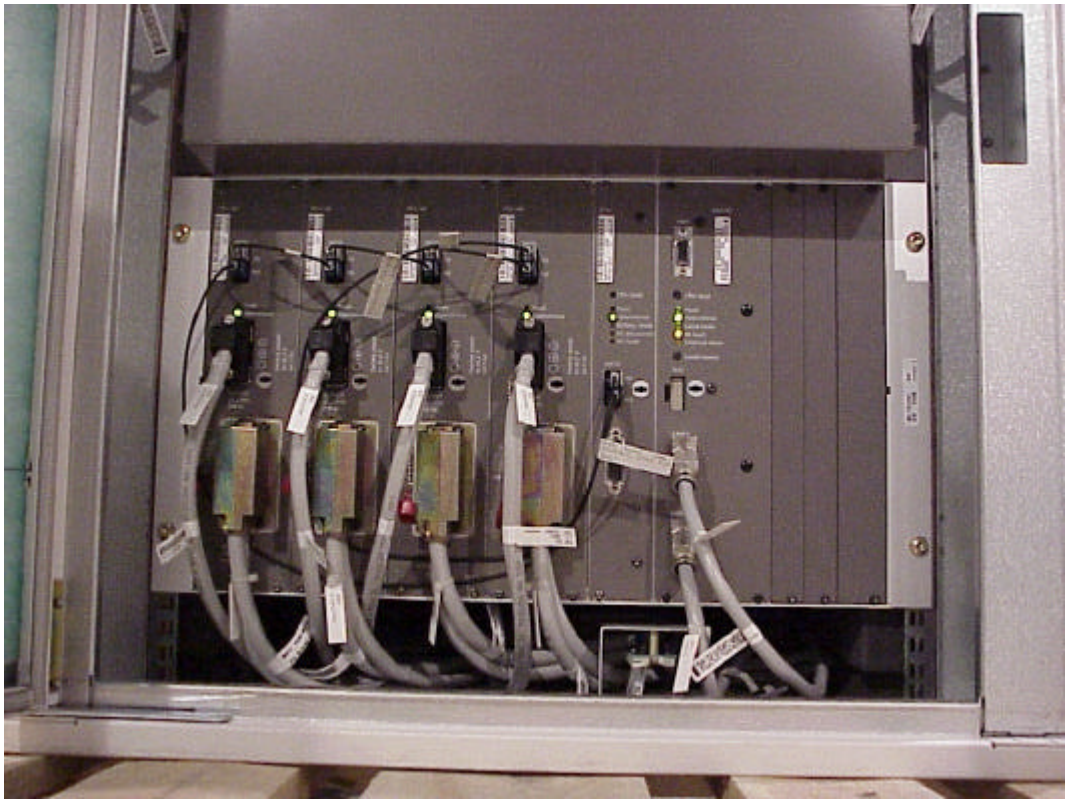
Top shelf view



Middle Shelf

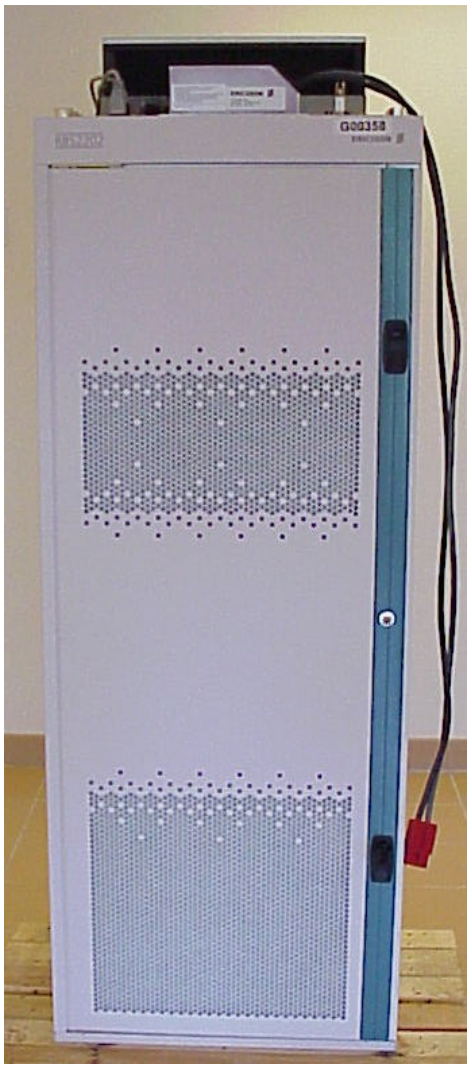


Bottom Shelf



RBS 2202 24 Volt DC / 240 Volt AC system

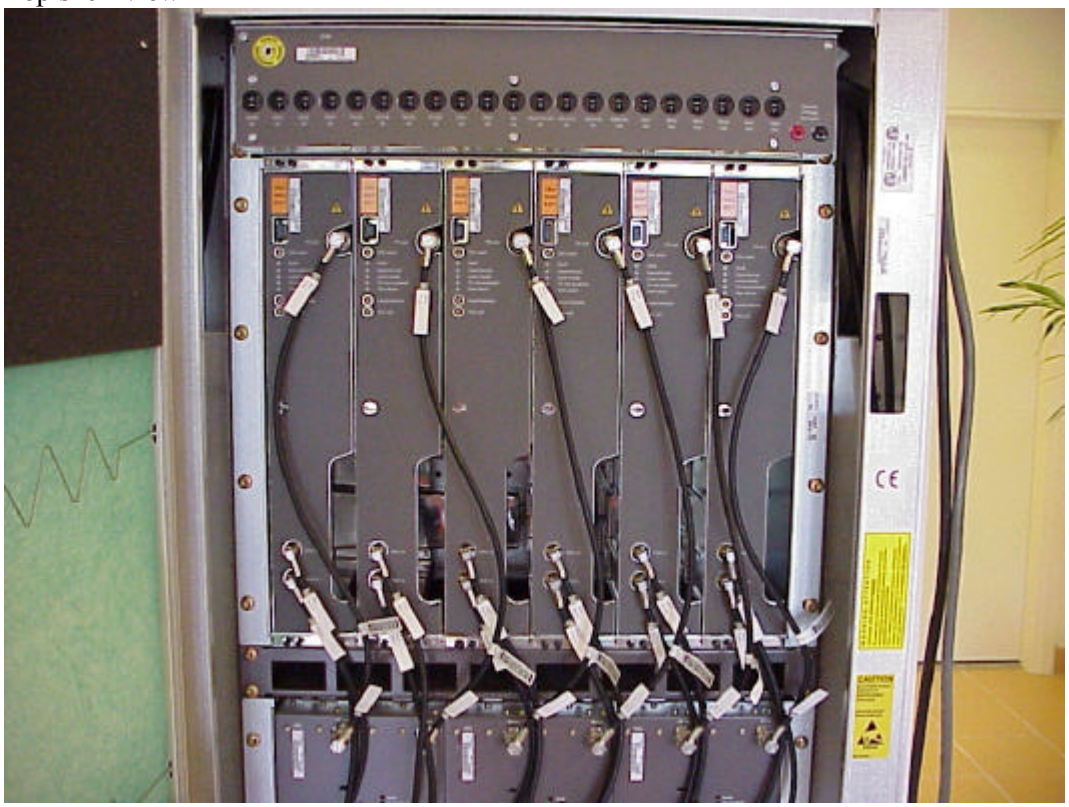
Front view



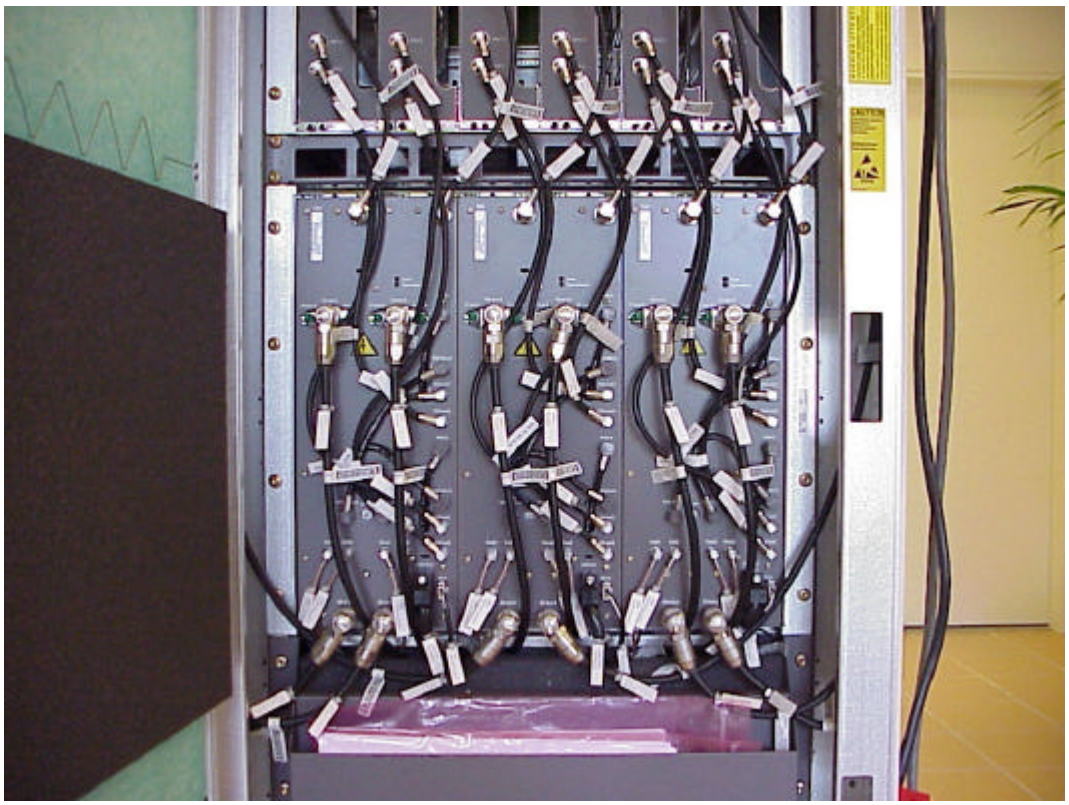
Rear view

Open door view

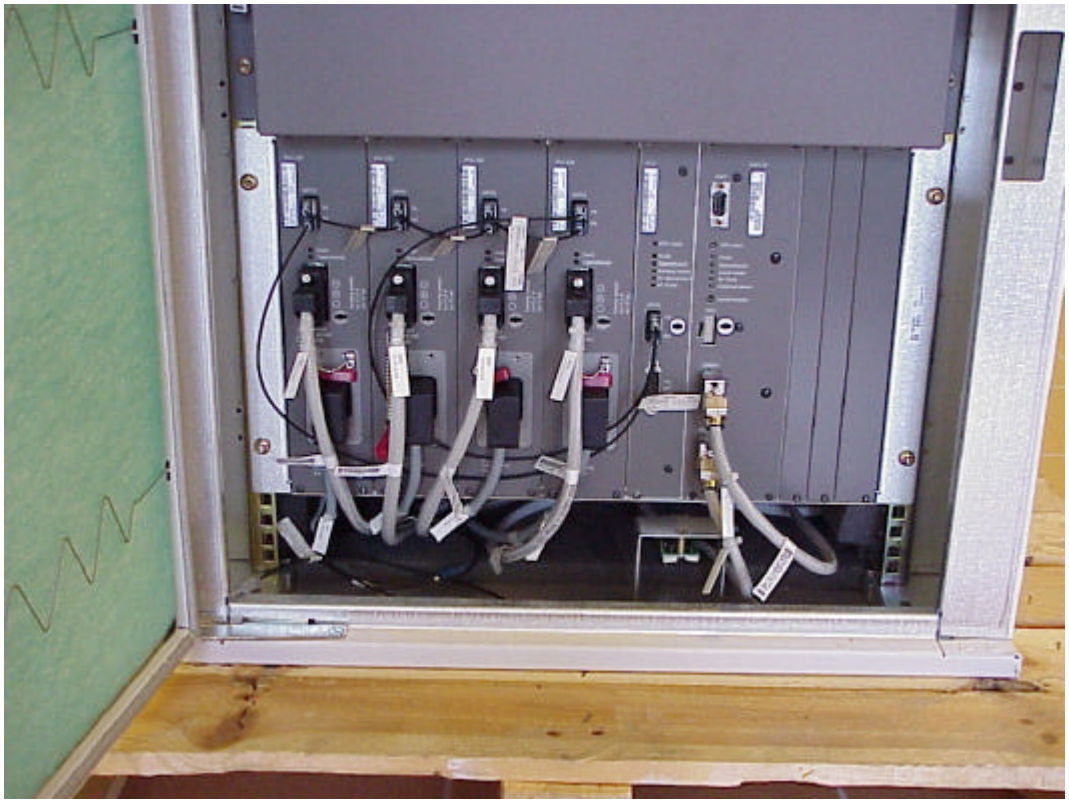
Top shelf view



Middle shelf view



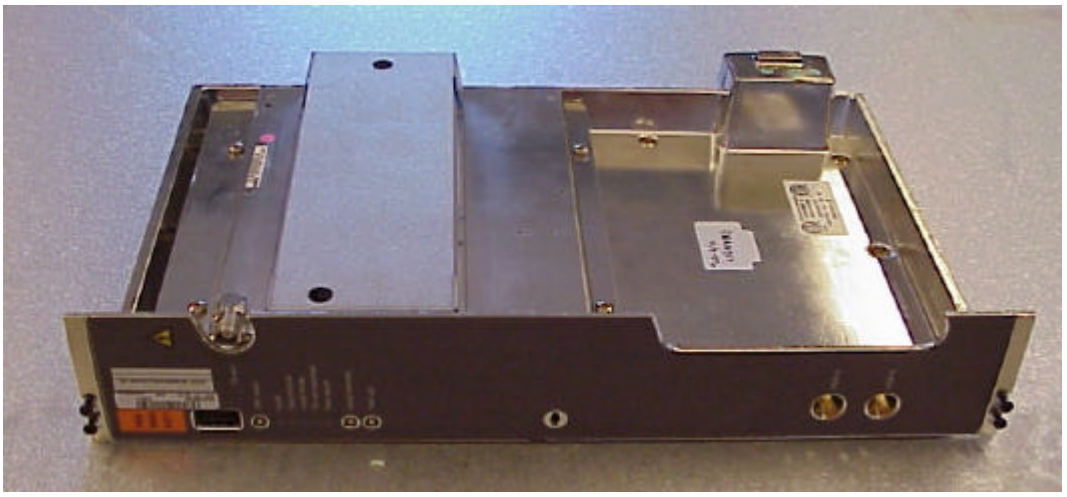
Bottom shelf view



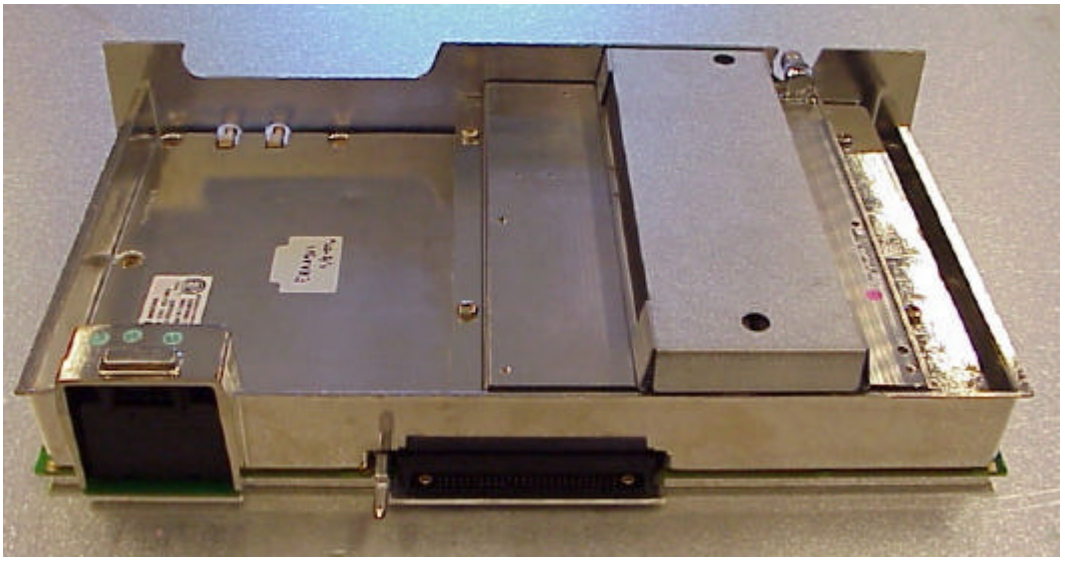
Sign:…..

Transceiver Unit KRC 131 49/15, R4G

Front side

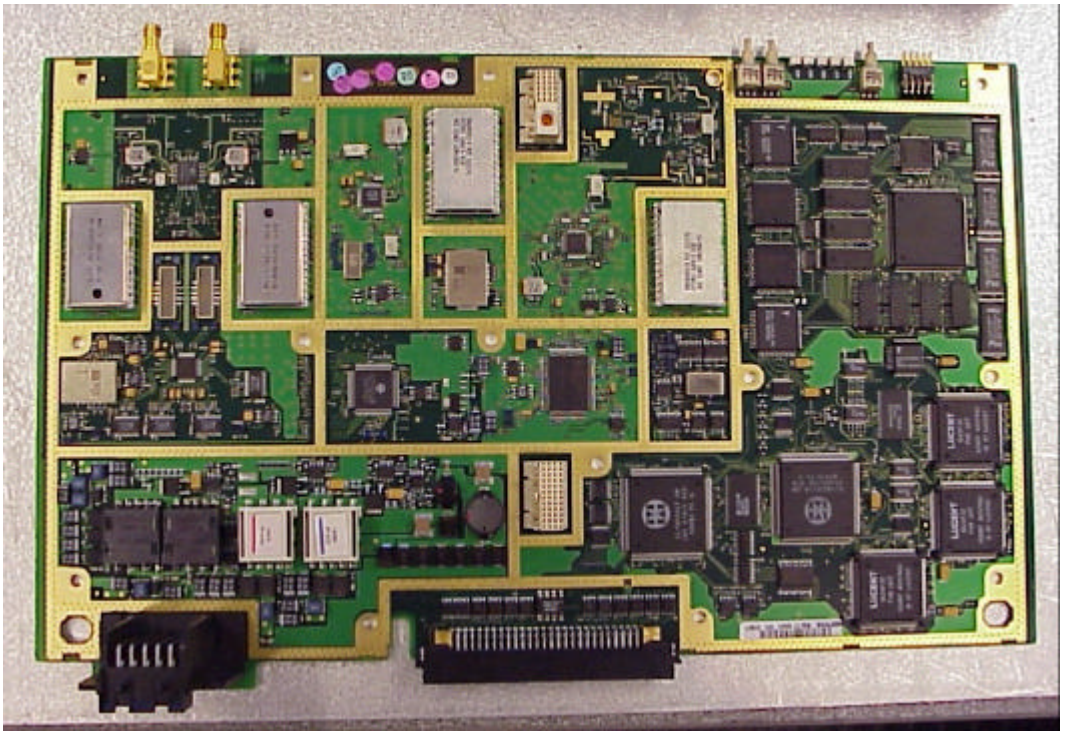


Rear side



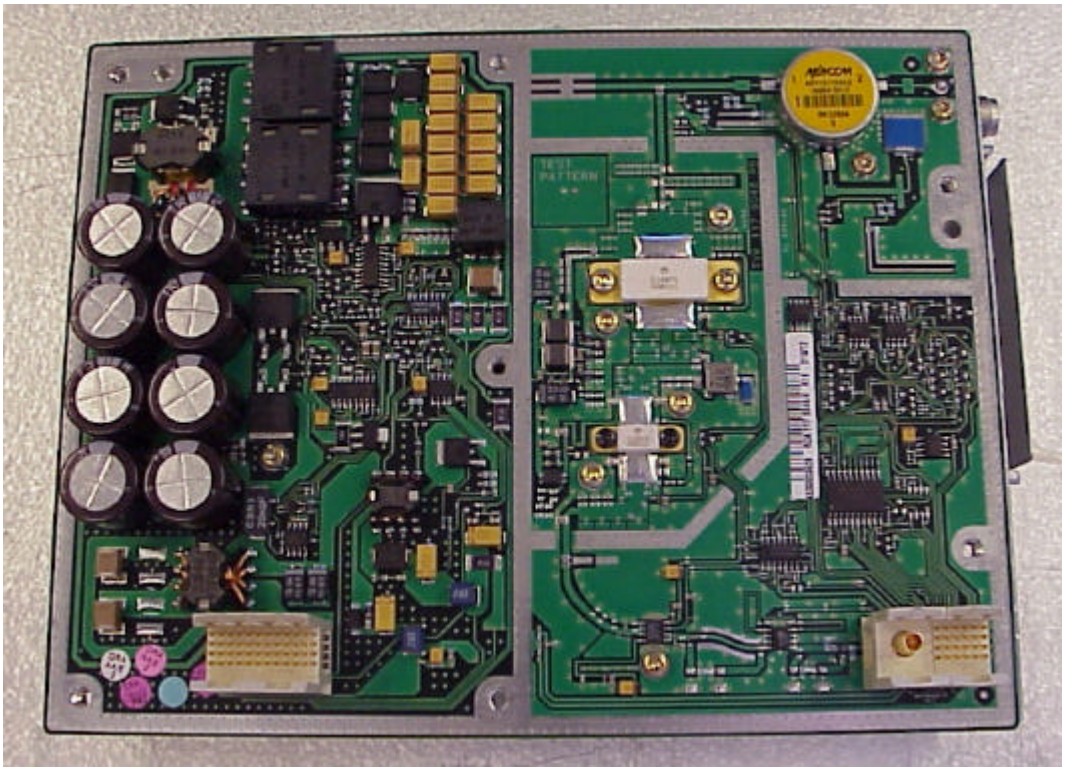
ID Label

Internal PCB



Sign:…..

Internal PCB



Sign:…..