

Straubing, July 28, 1997

TEST - REPORT**No. 51116-70522****for****Bedas 9320 legic**

Applicant: Kaba Benzing GmbH

Purpose of testing: To show compliance with
FCC part 15 subpart C

—

Note:

The test data of this report relate only to the individual item which have been tested.
This report shall not be reproduced except in full without the written approval of the
testing laboratory.

—

Table of Contents

- 1) Administrative Data
- 2) Summary of Test Results
- 3) Data of Operation Mode and Configuration of EUT
- 4) Performed Tests and Results
- 5) Annotations to Performed Tests
- 6) Referenced Regulations
- 7) Test Equipment List
- 8) Photographs of Test Setup
- 9) Test Results
- 10) Measurement Uncertainty Values

1) Administrative Data

Equipment Under Test: Bedas 9320 legic
Options/Accessories: with transponder card
Serial Number: 0291
Version of EUT: as received

Applicant:
(Full Address) Kaba Benzing GmbH
Albertstraße 3
78056 Villingen-Schwenningen

Contract Identification: ---

Contact Person: Mr. Maier

Manufacturer: Kaba Benzing GmbH

Receipt of EUT: 07/22/1997

Date of Test: 07/22/1997

Note: Mr. Maier was present during the tests.

Responsible for Testing: P. Zisterer

Responsible for Report: P. Zisterer (cj)

2) Summary

The tested sample fully complies with the requirements set forth in

FCC part 15 subpart C.



Johann Roidt
Technical Manager

Peter Zisterer
Test Engineer

3) Data of Operation Mode and Configuration of EUT

Operation Mode

- Reading of transponder
- EUT is connected with PC by the RS485/232-Converter
- Software "Service V 2.84" is running under DOS V 5.0

Configuration of cables of EUT

- Shielded power supply/data-cable (2 m)
- Shielded printer cable (2 m)
- Shielded monitor cable (1 m)
- Shielded data cable (RS485/232, 3 m)

Configuration of peripherals of EUT

- PC (NCR, 486 SX, 33 MHz)
- Keyboard (AT & T, PS/2)
- Mouse (Hewlett Packard, PS/2)
- Monitor (AT & T, 17")
- Parallel printer (Hewlett Packard, HP Think Jet)
- RS485/232-Converter (Kaba Benzing)

4) Performed Tests and Results

Test	Result	Note
FCC part 15 subpart C		
Conducted Emission 0.45 - 30 MHz	limit kept	
Radiated Emission 30 - 1000 MHz	limit kept	
Radiated Emission 0.009 - 30 MHz	limit kept	
Radiated Field Strength (30 m)	limit kept	
Frequency Tolerance	limit kept	

5) Annotations to Performed Tests

In general conducted emission tests in the frequency range 0.15 - 30 MHz are required to be performed with quasi-peak and average detector. To simplify testing the following procedure is used:

First the whole spectrum of emission caused by equipment under test (EUT) is recorded with detector set to peak. After that all emission levels having less margin than 20 dB to or exceeding the appropriate limit (in general average limit is 10 dB lower than quasi-peak limit) are retested with detector set to quasi-peak. If average limit is kept no additional scan with average detector is necessary. In cases of emission levels between quasi-peak and average limit an additional scan with detector set to average has to be recorded.

Radiated emission tests in the frequency range 30 - 1000 MHz are performed in two steps:

First a peak scan using an anechoic room with test distance of 3 m between measuring antenna and EUT is performed to get the whole spectrum of emission caused by EUT. During testing EUT is rotated all around and measuring antenna is raised and lowered from 1 to 4 m to find the maximum emission levels. In the test report this measurement is characterized as prescan. Limit lines are added to these prescan charts to check margin to appropriate limit. In cases of required test distances differing from 3 metres limit levels are converted to 3 metres using the theoretical conversion factors.

Finally emission levels having less margin than 6 dB to or exceeding the limit are retested using an open area test site with the required test distance and detector of the test receiver set to quasi-peak. Again EUT is rotated all around and measuring antenna is raised and lowered from 1 to 4 m to find the maximum emission levels.

6) Referenced Regulations

O EN 50081-1:1992	Electromagnetic compatibility - Generic emission standard Part 1: Residential, commercial and light industry
O EN 50081-2:1993	Electromagnetic compatibility - Generic emission standard Part 2: Industrial environment
O EN 55022:1994	Limits and methods of measurement of radio disturbance characteristics of information technology equipment
O EN 55011:1991	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio frequency equipment
X CISPR 16 (1977)	CISPR specification for radio interference measuring apparatus and measurement methods Amendment No. 1 (1980) / Amendment No. 2 (1983)
O EN 60555-2:1987	Disturbances in supply systems caused by household appliances and similar electrical equipment; Part 2: Harmonics
O EN 60601-1-2:1993	Medical electrical equipment Part 1: General requirements for safety 2. Collateral standard: Electromagnetic compatibility - Requirements and tests
O EN 61000-3-2:1995	Electromagnetic compatibility (EMC) Part 3: Limits Section 2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
O EN 61000-3-3:1995	Electromagnetic compatibility (EMC) Part 3: Limits Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current ≤ 16 A per phase
O FCC Part 15 Subpart B	Code of federal regulations; part 15 - radio frequency devices; subpart B - unintentional radiators (digital devices)
X ANSI C63.4-1992	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range from 9 kHz to 40 GHz

Referenced Regulations (continued)

O EN 50082-1:1992	Electromagnetic compatibility, Generic immunity standard Part 1: Residential, commercial and light industry
O EN 50082-2:1995	Electromagnetic compatibility, Generic immunity standard Part 2: Industrial Environment
O EN 61000-4-2:1995	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 2: Electrostatic discharge immunity test
O EN 61000-4-4:1995	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 4: Electrical fast transient/burst immunity test
O EN 61000-4-5:1995	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 5: Surge immunity test
O EN 61000-4-8:1993	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 8: Power frequency magnetic field immunity test
O EN 61000-4-11:1994	Electromagnetic compatibility (EMC) Part 4: Testing and measuring techniques Section 11: Voltage dips, short interruptions and voltage variations immunity tests
O ENV 50140:1993	Electromagnetic compatibility - Basic Immunity Standard - Radiated, radio-frequency electromagnetic field - immunity test
O ENV 50204:1995	Radiated electromagnetic field from digital radio telephones immunity test
O ENV 50141:1993	Electromagnetic compatibility; Basic immunity standard; Conducted disturbances induced by radio-frequency fields; Immunity test
O IEC 801-2:1984/1991	Electrostatic discharge requirements
O IEC 801-3:1984	Radiated electromagnetic field requirements
O IEC 801-4:1988	Electrical fast transients requirements
O IEC 65A/77B (Sec) 120/87:1991	Surge immunity requirements

7) Test Equipment List (Version 10/31/1996)

Radio Interference Emission Testing

	Type	Model	Serial Number	Manufacturer
<input type="checkbox"/>	EMI test receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
<input type="checkbox"/>	Spectrum analyzer	R 3271	05050023	Advantest
<input type="checkbox"/>	Test receiver	ESH 3	880112/032	Rohde & Schwarz
<input type="checkbox"/>	Test receiver	ESHS 10	860043/016	Rohde & Schwarz
<input type="checkbox"/>	Test receiver	ESV	881414/009	Rohde & Schwarz
<input type="checkbox"/>	Test receiver	ESVP	881120/024	Rohde & Schwarz
<input type="checkbox"/>	Audio analyzer	UPA	862954	Rohde & Schwarz
<input type="checkbox"/>	Mains adapter	UPA - B4	1002-1200-17	Rohde & Schwarz
<input type="checkbox"/>	Preamplifier	ESV-Z3	860907/004	Rohde & Schwarz
<input type="checkbox"/>	Preamplifier	R14601		Advantest
<input type="checkbox"/>	Pulse limiter	ESH 3-Z2	1144	Rohde & Schwarz
<input type="checkbox"/>	V-network	ESH 3-Z5	862770/021 <small>B1060</small>	Rohde & Schwarz
<input type="checkbox"/>	V-network	ESH 3-Z5	830952/025 <small>B1218</small>	Rohde & Schwarz
<input type="checkbox"/>	V-network	ESH 3-Z6	830722/010	Rohde & Schwarz
<input type="checkbox"/>	V-network	NSLK 8127	8127152	Schwarzbeck
<input type="checkbox"/>	Artificial mains network	ESH 2-Z5	842966/004	Rohde & Schwarz
<input type="checkbox"/>	T-network	ESH 3-Z4	890602/011	Rohde & Schwarz
<input type="checkbox"/>	T-network	ESH 3-Z4	890602/012	Rohde & Schwarz
<input type="checkbox"/>	High impedance probe	TK 9416	01	Schwarzbeck
<input type="checkbox"/>	High impedance probe	TK 9416	02	Schwarzbeck
<input type="checkbox"/>	Current probe	ESH 2-Z1	863366/18	Rohde & Schwarz
<input type="checkbox"/>	Current probe	ESV-Z1	862553/3	Rohde & Schwarz
<input type="checkbox"/>	Absorbing clamp	MDS 21	80911	Lüthi
<input type="checkbox"/>	Absorbing clamp	MDS 21	79690	Lüthi
<input type="checkbox"/>	Loop antenna	HFH2-Z2	882964/1	Rohde & Schwarz
<input type="checkbox"/>	Biconical antenna Chamber 3	HK 116	836239/02	Rohde & Schwarz
<input type="checkbox"/>	Log. per. antenna Chamber 3	HL 223	834408/12	Rohde & Schwarz
<input type="checkbox"/>	Biconical antenna EG 1	HK 116	842204/001	Rohde & Schwarz
<input type="checkbox"/>	Log. per. antenna EG 1	HL 223	841516/023	Rohde & Schwarz
<input type="checkbox"/>	Mains analyzer	DPA 503	496 - 02	EM Test
<input type="checkbox"/>	Controller	HIS 500	X71010	EM Test
<input type="checkbox"/>	AC amplifier	ACS 500	HK51736	EM Test
<input type="checkbox"/>	Mains impedance	AIF 500	X71062	EM Test
<input type="checkbox"/>	Shielded room	Nr. 1	1451	Senton
<input type="checkbox"/>	Shielded room	Nr. 2	1452	Senton
<input type="checkbox"/>	Semi-anechoic room	Nr. 3	1453	Siemens
<input type="checkbox"/>	Shielded room	Nr. 4	3FD 100 544	Euroshield
<input type="checkbox"/>	Shielded room	Nr. 5	5468	Ray Proof Division
<input type="checkbox"/>	Open Area Test Site	EG 1		Senton

Immunity Testing

	Type	Model	Serial Number	Manufacturer
O	ESD simulator	NSG 435	000290	Schaffner
O	EFT generator	NSG 1025	3020	Schaffner
O	Ultra compact simulator	UCS 500	1195-30	EM Test
O	Coupling clamp	CDN 8014	131	Schaffner
O	Coupling clamp	SL 400-071D	007	Schaffner
O	Coupling filter	FP 16	080554-14-84	Haefely
O	Signal generator	SMT 03	838129/029 837533/032	Rohde & Schwarz
O	Power amplifier	150 L	8835	Amplifier Research
O	Power amplifier	200 W 1000	12904	Amplifier Research
O	Power amplifier	25S1G4	23171	Amplifier Research
O	Power meter	NRVS	838624/016	Rohde & Schwarz
O	E-field generator	3107 B	2302	Emco
O	Biconical antenna	VHBA 9123	1018	Schwarzbeck
O	Log. periodic antenna	AT 1080	12834	Amplifier Research
O	Isotropic field probe	FP 2000	12847	Amplifier Research
O	Isotropic field monitor	FM 2004	12632	Amplifier Research
O	Surge generator	NSG 650	1679204	Schaffner
O	Ultra compact simulator	UCS 500	1195-30	EM Test
O	Coupling network	CDN 110	1649135	Schaffner
O	Coupling network	CDN 115	132	Schaffner
O	Dropping resistor	INA 110-40	121	Schaffner
O	Oscilloscope	HM 408	9005 F 3144	Hameg
O	Signal generator	SMX	883184/018	Rohde & Schwarz
O	Power amplifier	411 LA	299	ENI
O	Power amplifier	HVV 250	836956/004	Rohde & Schwarz
O	Power meter	NRV	863825/018	Rohde & Schwarz
O	Coupling network	FCC - 801-T4	68	FCC
O	Coupling network	FCC - 801- AF4	47	FCC
O	Coupling network	FCC - 801- M5-25	16	FCC
O	Coupling network	FCC - 801- C1	64	FCC
O	Coupling network	FCC - 801- AF4	48	FCC
O	Coupling network	FCC - 801- M3-25	117	FCC
O	Coupling network	FCC - 801- M4-25	17	FCC
O	Coupling network	CDN 801-M3	---	Senton
O	Coupling network	CDN 801-S37	---	Senton
O	EM injection clamp	EM 101	35354	Lüthi
O	Ferrite tube clamp	FTC 101	4413	Lüthi
O	Current clamp	FCC-120-9B	15	FCC

Immunity Testing - Continued

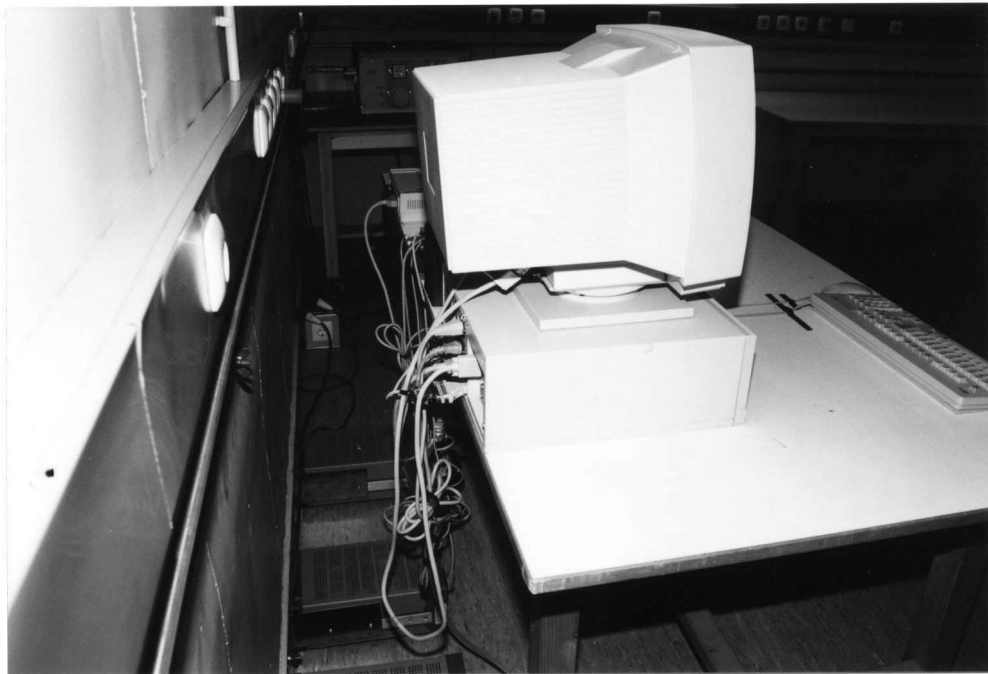
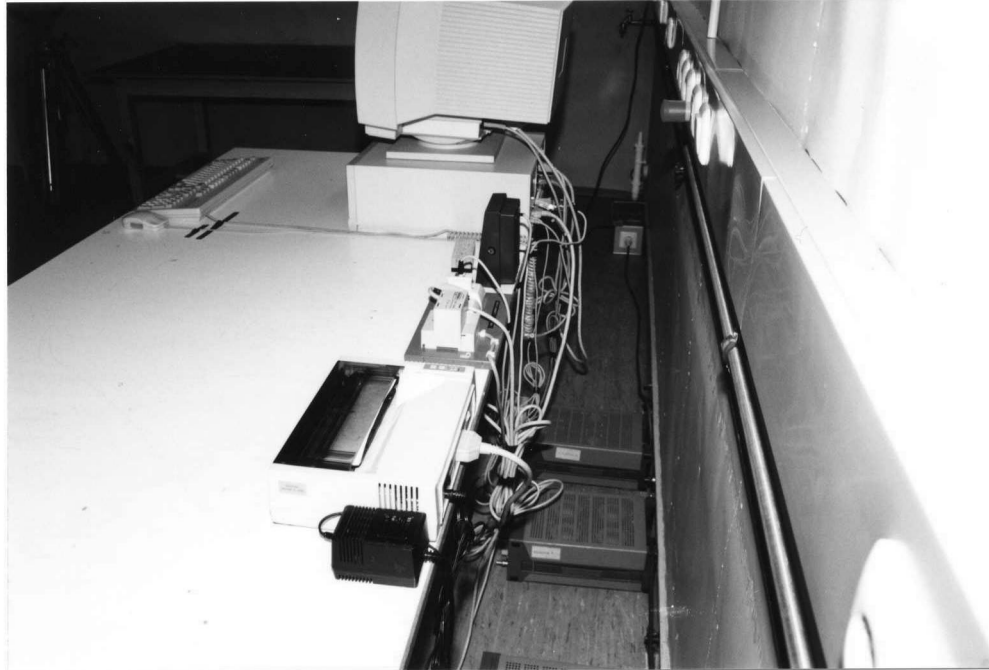
	Type	Model	Serial Number	Manufacturer
<input type="radio"/>	Ultra compact simulator	UCS 500	1195-30	EM Test
<input type="radio"/>	Oscilloscope	54602B	US35060304	Hewlett Packard
<input type="radio"/>	Mains analyzer	DPA 503	496-02	EM Test
<input type="radio"/>	Controller	HIS 500	X71010	EM Test
<input type="radio"/>	AC amplifier	ACS 500	HK51736	EM Test
<input type="radio"/>	Mains impedance	AIF 500	X71062	EM Test
<input type="radio"/>	Helmholtz coils	HC01	---	Senton
<input type="radio"/>	Controller	HIS 500	X71010	EM Test
<input type="radio"/>	AC amplifier	ACS 500	HK51736	EM Test
<input type="radio"/>	Mains impedance	AIF 500	X71062	EM Test
<input type="radio"/>	Shielded room	No. 1	1451	Senton
<input type="radio"/>	Shielded room	No. 2	1452	Senton
<input type="radio"/>	Semi-anechoic room	No. 3	1453	Siemens
<input type="radio"/>	Shielded room	No. 4	3FD 100 544	Euroshield
<input type="radio"/>	Shielded room	No. 5	5468	Ray Proof Division

8) Photographs of Test Setup

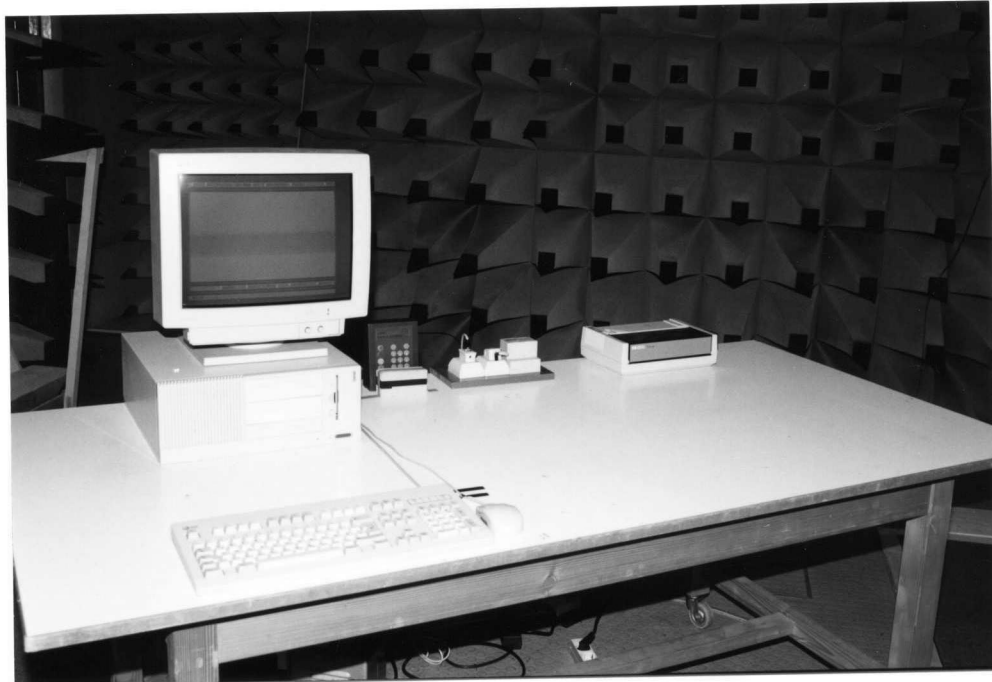
Test setup conducted emission test 450 kHz - 30 MHz



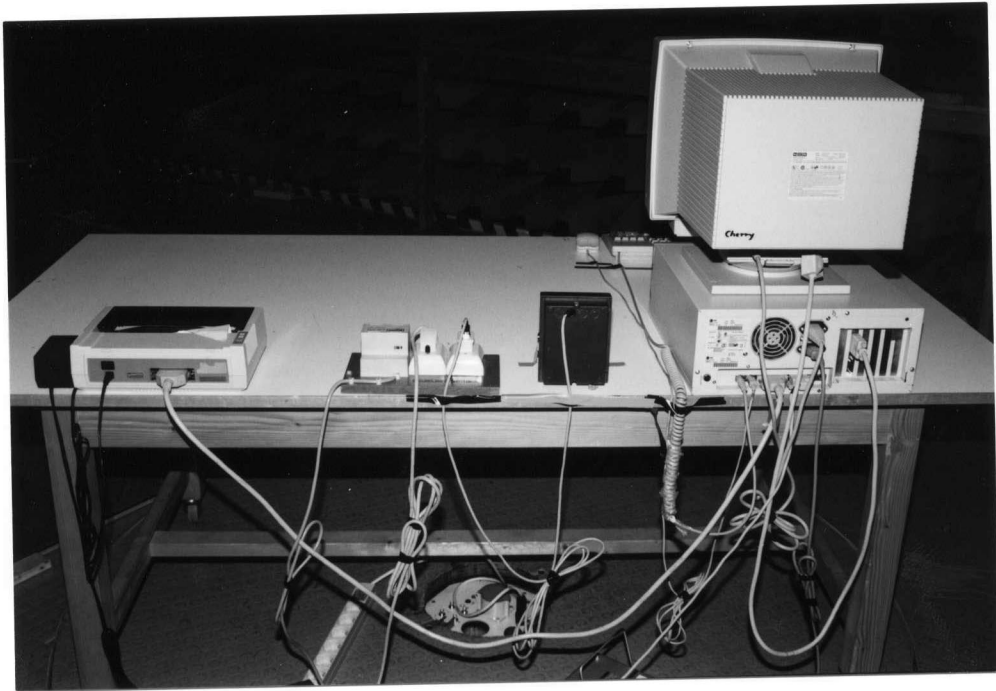
Test setup conducted emission test 450 kHz - 30 MHz



Test setup radiated emission test 30 MHz - 1000 MHz
- anechoic chamber -



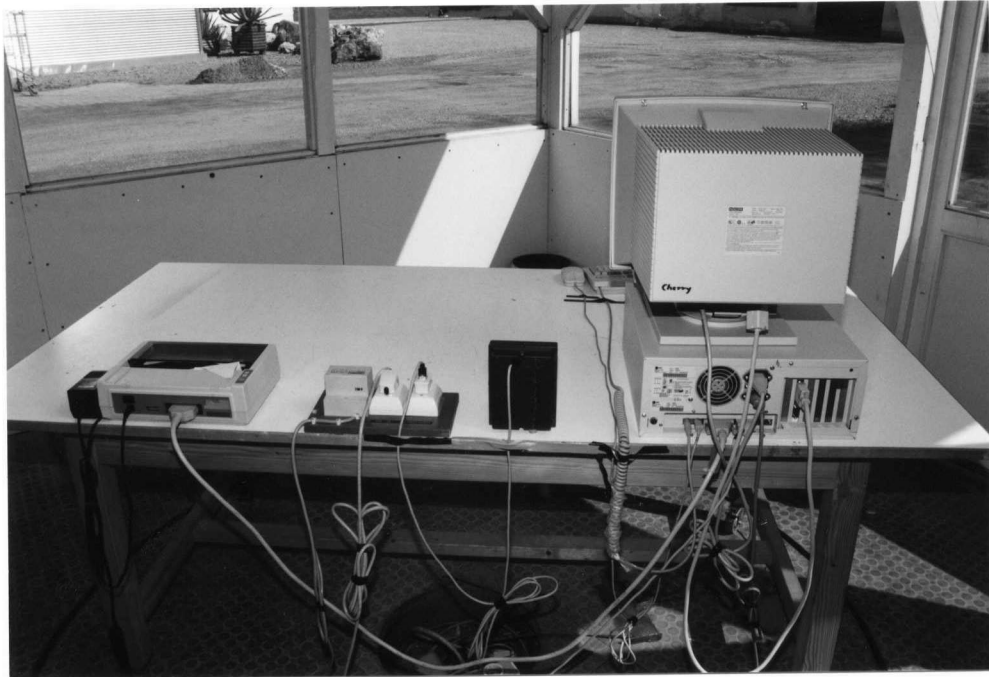
Test setup radiated emission test 30 MHz - 1000 MHz
- anechoic chamber -



Test setup radiated emission test 30 MHz - 1000 MHz
- open area test site -



Test setup radiated emission test 30 MHz - 1000 MHz
- open area test site -



Test setup radiated emission test 9 kHz - 30 MHz



9) Test Results