

Straubing, August 20, 1998

TEST - REPORT

No. 50831-80684

for

NBase 3.2

transponder reader system

Applicant: Hermos Informatik GmbH

Purpose of testing: To show compliance with

FCC Code of Federal Regulations,
Part 15 Subpart C, Sections §15.207
and §15.209

Industry Canada Radio Standards
Specification RSS-210 Issue 2,
Sections 6.2.1, 6.6, 7.3 and 7.4

Note:

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

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1. Administrative Data

Equipment Under Test (EUT): NBase 3.2
Serial number: Prototype 1
Type of equipment: transponder reader system
Parts/accessories: ---
FCC-ID: N5GTLG

Applicant:
(full address) Hermos Informatik GmbH
Informatik GmbH
Gartenstraße 19
95490 Mistelgau
Germany

Contract identification: ---
Contact person: Mr. Düngfelder
Manufacturer: Hermos Informatik GmbH

Receipt of EUT: July 28, 1998
Date of test:
Note: ---

Test Laboratory:
(full address): Senton GmbH EMI/EMC Test Center
Aeussere Fruehlingstrasse 45
D-94315 Straubing
Germany
Contact person: Mr. Johann Roidt
FCC file number: 31040/SIT 1300F2
Industry Canada file number: IC 3050

Responsible for testing: Rainer Heller
Responsible for test report: Rupert Kohlhäufel

2. Summary of Test Results

The tested sample complies with the requirements set forth in the

**Code of Regulations Part 15 Subpart C, Sections §15.207 and §15.209
(intentional radiators) of the Federal Communication Commission (FCC)**

and the

**Radio Standards Specification RSS-210 Issue 2, Sections 6.2.1, 6.6, 7.3 and
7.4 for Low Power Licence-Exempt Radiocommunication Devices of Industry
Canada.**



Johann Roidt
Technical Manager



Rainer Heller
Test Engineer

3. Operation Mode of EUT

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC

4. Configuration of EUT and Peripheral Devices

Configuration of EUT

EUT with either rod or micro antenna is configured as stand-alone tabletop equipment.

Configuration of cables of EUT

Shielded data cable (100 cm) including DC supply lines

Configuration of peripheral devices connected to EUT

Not applicable

5. Measuring Methods

5.1. Radiated Emission 9 kHz - 30 MHz (§15.209, §15.205 a,b / RSS-210 Sections 6.2.1, 6.3)

Radiated emissions were measured over the frequency range from 9 kHz to 30 MHz. The bandwidth of the EMI-receiver was set to 200 Hz below 150 kHz and to 10 kHz above 150 kHz. According to section §15.209 (d) final measurements were performed with the detector set to CISPR quasi-peak except for the frequency bands 9 - 90 kHz and 110 - 490 kHz where average detector is employed.

The test setup was made in accordance with ANSI C63.4-1992.

Preliminary scans were taken in a shielded room with a test-distance of 3 meters and detector-function of EMI-receiver set to peak. To search for the maximum emission EUT was placed in three orthogonal planes and rotated all around as well as the vertically polarized loop antenna on its vertical axis by 360°. Cables and equipment were placed and moved within the range of positions likely to find their maximum emissions. As a result of these preparations worst case configuration was recorded to determine the radiated EMI-profile of the EUT. Final test was performed using an open-area test-site with a test-distance of 30 meters. In cases the regulation requires testing at 300 meters distance the results are extrapolated by using either an inverse linear distance extrapolation factor of 40 dB/decade or the extrapolation factor is determined by making a second measurement at 10 meters distance. The provisions of §15.31 (d) and §15.31 (f) apply.

See figure 2 for the measurement setup.

Test equipment used (see equipment list for details):

03, 04, 37, 60, 63, 66

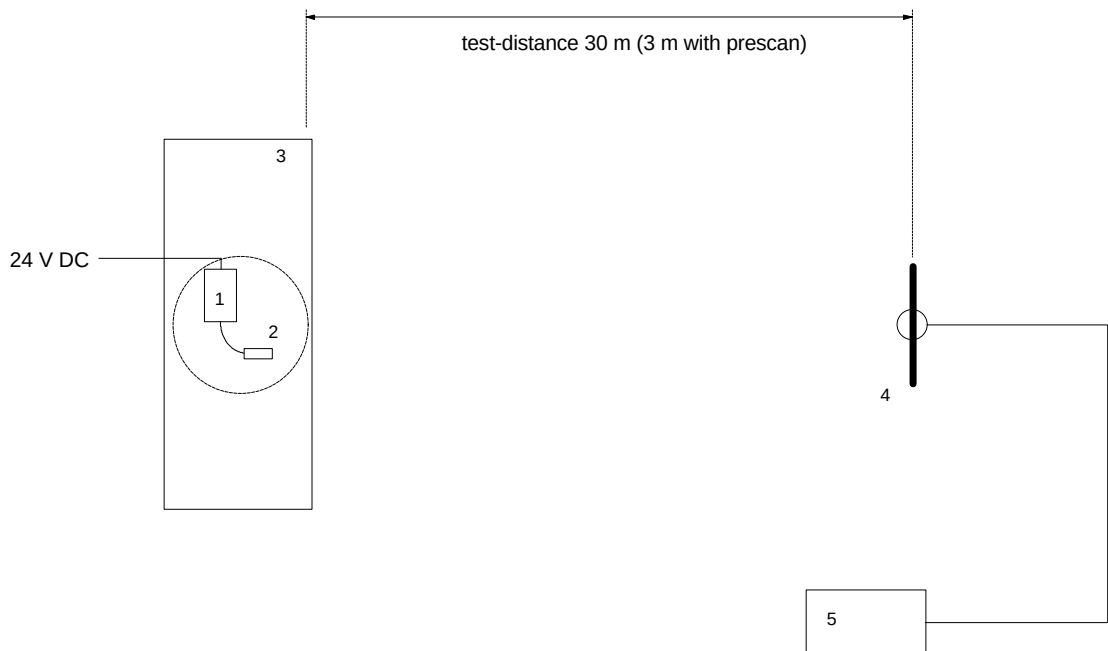


Figure 1: Measurement setup for radiated emission test below 30 MHz

- | | |
|---------------------------|------------------------------|
| 1 Base unit (EUT) | 4 Measurement antenna |
| 2 RF antenna (EUT) | 5 Test receiver |
| 3 Wooden table | |

5.2. Radiated Emission 30 MHz - 1 GHz (FCC §15.209 / RSS-210 Sections 6.2.1, 7.3)

Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz. The bandwidth of the EMI-receiver is set to 120 kHz and the detector-function is set to CISPR quasi-peak.

The test setup is made in accordance with ANSI C63.4-1992.

Measurements are made in both the horizontal and vertical planes of polarization. Preliminary scans are taken in a semi-anechoic room using a spectrum analyzer with the detector function set to peak. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.

All tests are performed at a test-distance of 3 meters.

For final testing an open-area test-site is used. During the tests the EUT is rotated all around and the receiving-antenna is raised and lowered from 1 meter to 4 meters to find the maximum levels of emissions. The cables and equipment is placed and moved within the range of position likely to find their maximum emissions.

See figure 2 for the measurement setup.

Test equipment used (see equipment list for details):

01, 02, 05, 12, 38, 39, 40, 41, 58, 61, 64, 66

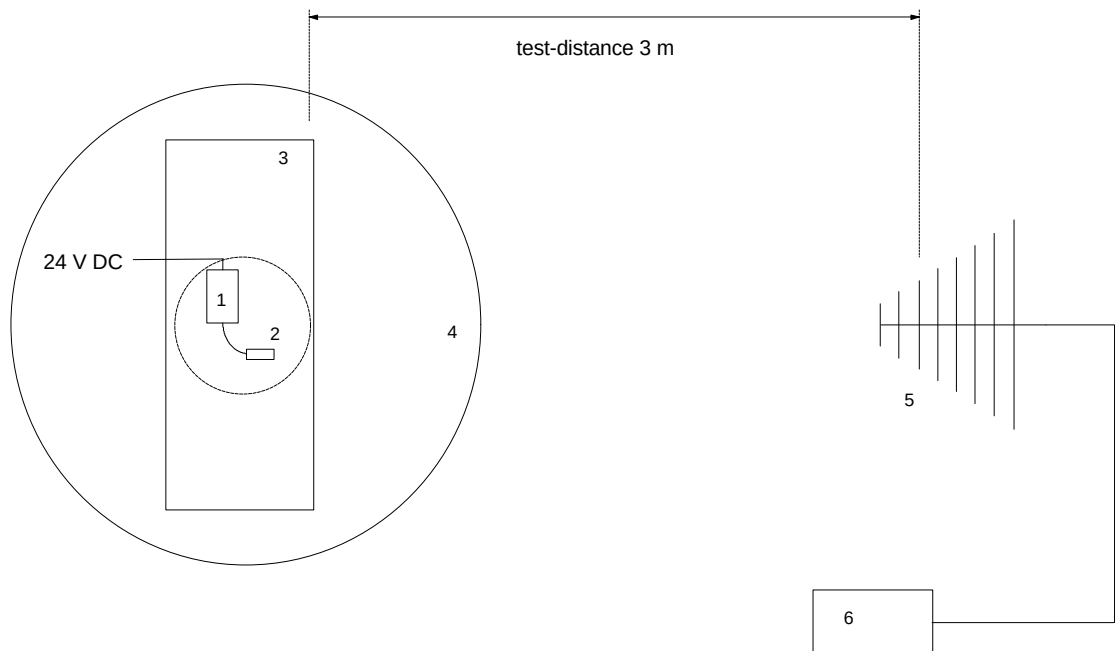


Figure 2: Measurement setup for radiated emission test 30 MHz - 1 GHz

- | | |
|---------------------------|------------------------------|
| 1 Base unit (EUT) | 4 Turn table |
| 2 RF antenna (EUT) | 5 Measurement antenna |
| 3 Wooden table | 6 Test receiver |

6. Equipment List

To facilitate reference to test equipment used for related tests, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory.

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	R 3271	05050023	Advantest
02	EMI Test Receiver	ESMI	839379/013 839587/006	Rohde & Schwarz
03	Test Receiver	ESH 3	880112/032	Rohde & Schwarz
04	Test Receiver	ESHS 10	860043/016	Rohde & Schwarz
05	Test Receiver	ESV	881414/009	Rohde & Schwarz
06	Test Receiver	ESVP	881120/024	Rohde & Schwarz
07	Audio Analyzer	UPA	862954	Rohde & Schwarz
08	Power Meter	NRVS	836856/015	Rohde & Schwarz
09	Power Sensor	NRV-Z52	837901/030	Rohde & Schwarz
10	Power Sensor	NRV-Z4	863828/015	Rohde & Schwarz
11	Preamplifier	ESV-Z3	860907/004	Rohde & Schwarz
12	Preamplifier	R14601		Advantest
13	Preamplifier	ACX/080-3030	32640	CTT
14	Preamplifier	ACO/180-3530	32641	CTT
15	Signal Generator	SMS	872166/039	Rohde & Schwarz
16	Signal Generator	HP 8673 D	2930A00966	Hewlett Packard
17	Waveform Generator	HP 33120 A	US34005375	Hewlett Packard
18	Attenuator 20 dB	4776-20	9503	Narda
19	Attenuator 10 dB	4776-10	9412	Narda
20	Pulse Limiter	ESH 3-Z2	1144	Rohde & Schwarz
21	Pulse Limiter	11947 A	3107A00566	Hewlett Packard
22	V-Network	ESH 3-Z5	862770/018	Rohde & Schwarz
23	V-Network	ESH 3-Z5	894785/005	Rohde & Schwarz
24	V-Network	ESH 3-Z5	830952/025	Rohde & Schwarz
25	V-Network	ESH 3-Z6	830722/010	Rohde & Schwarz
26	V-Network	NSLK 8127	8127152	Schwarzbeck
27	V-Network	NNLA 8119	8119148	Schwarzbeck
28	V-Network	SE 01	01	Senton
29	T-Network	ESH 3-Z4	890602/011	Rohde & Schwarz
30	T-Network	ESH 3-Z4	890602/012	Rohde & Schwarz
31	High Impedance Probe	TK 9416	01	Schwarzbeck
32	High Impedance Probe	TK 9416	02	Schwarzbeck
33	Current Probe	ESH 2-Z1	863366/18	Rohde & Schwarz
34	Current Probe	ESV-Z1	862553/3	Rohde & Schwarz

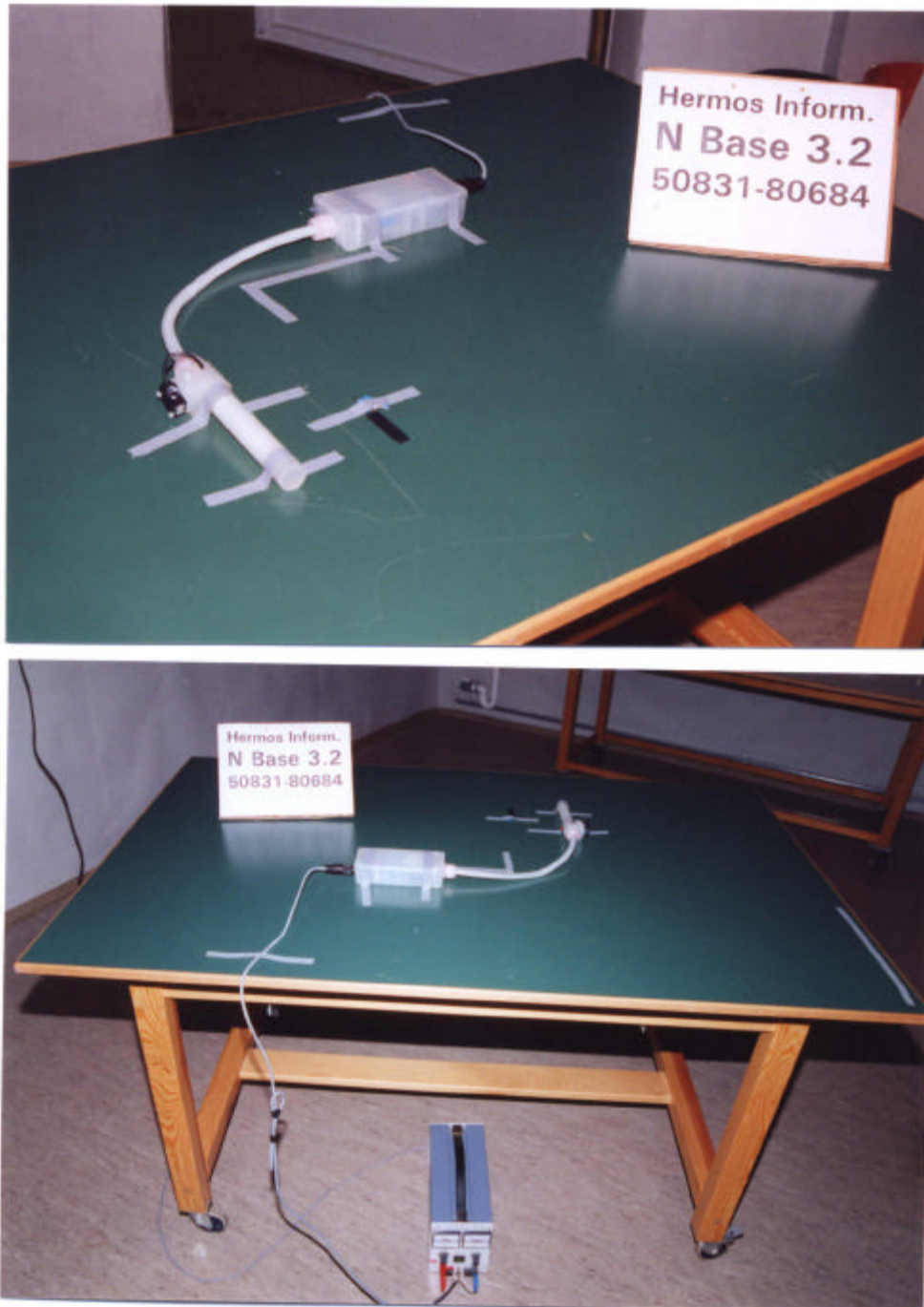
No.	Type	Model	Serial Number	Manufacturer
35	Absorbing Clamp	MDS 21	80911	Lüthi
36	Absorbing Clamp	MDS 21	79690	Lüthi
37	Loop Antenna	HFH2-Z2	882964/1	Rohde & Schwarz
38	Biconical Antenna	HK 116	842204/001	Rohde & Schwarz
39	Biconical Antenna	HK 116	836239/02	Rohde & Schwarz
40	Log. Periodic Antenna	HL 223	841516/023	Rohde & Schwarz
41	Log. Periodic Antenna	HL 223	834408/12	Rohde & Schwarz
42	Horn Antenna	3115	9508-4553	Emco
43	Horn Antenna	3160-03	9112-1003	Emco
44	Horn Antenna	3160-04	9112-1001	Emco
45	Horn Antenna	3160-05	9112-1001	Emco
46	Horn Antenna	3160-06	9112-1001	Emco
47	Horn Antenna	3160-07	9112-1008	Emco
48	Horn Antenna	3160-08	9112-1002	Emco
49	Horn Antenna	3160-09	9403-1025	Emco
50	Digital multimeter	199	463386	Keithley
51	DC Power Supply	NGSM 32/10	203	Rohde & Schwarz
52	DC Power Supply	NGB	2455	Rohde & Schwarz
53	DC Power Supply	NGA	386	Rohde & Schwarz
54	Temperature Test Chamber	HT4010	07065550	Heraeus
55	Cable	RG214	1309	Senton
56	Cable	200CM_001	1357	Rosenberger
57	Cable	150CM_001	1479	Rosenberger
58	Cable Set EG1	RG214	1189 - 1191	Senton
59	Cable Set Cabine 1	RG214		Senton
60	Cable Set Cabine 2	RG214		Senton
61	Cable Set Cabine 3	RG214		Senton
62	Shielded Room	No. 1	1451	Senton
63	Shielded Room	No. 2	1452	Senton
64	Semi-anechoic Chamber	No. 3	1453	Siemens
65	Shielded Room	No. 4	1454	Euroshield
66	Open Area Test Site	EG 1		Senton
67	Test fixture			Senton

7. Photographs Taken During Testing

7.1. Photographs of NBase 3.2 with rod antenna

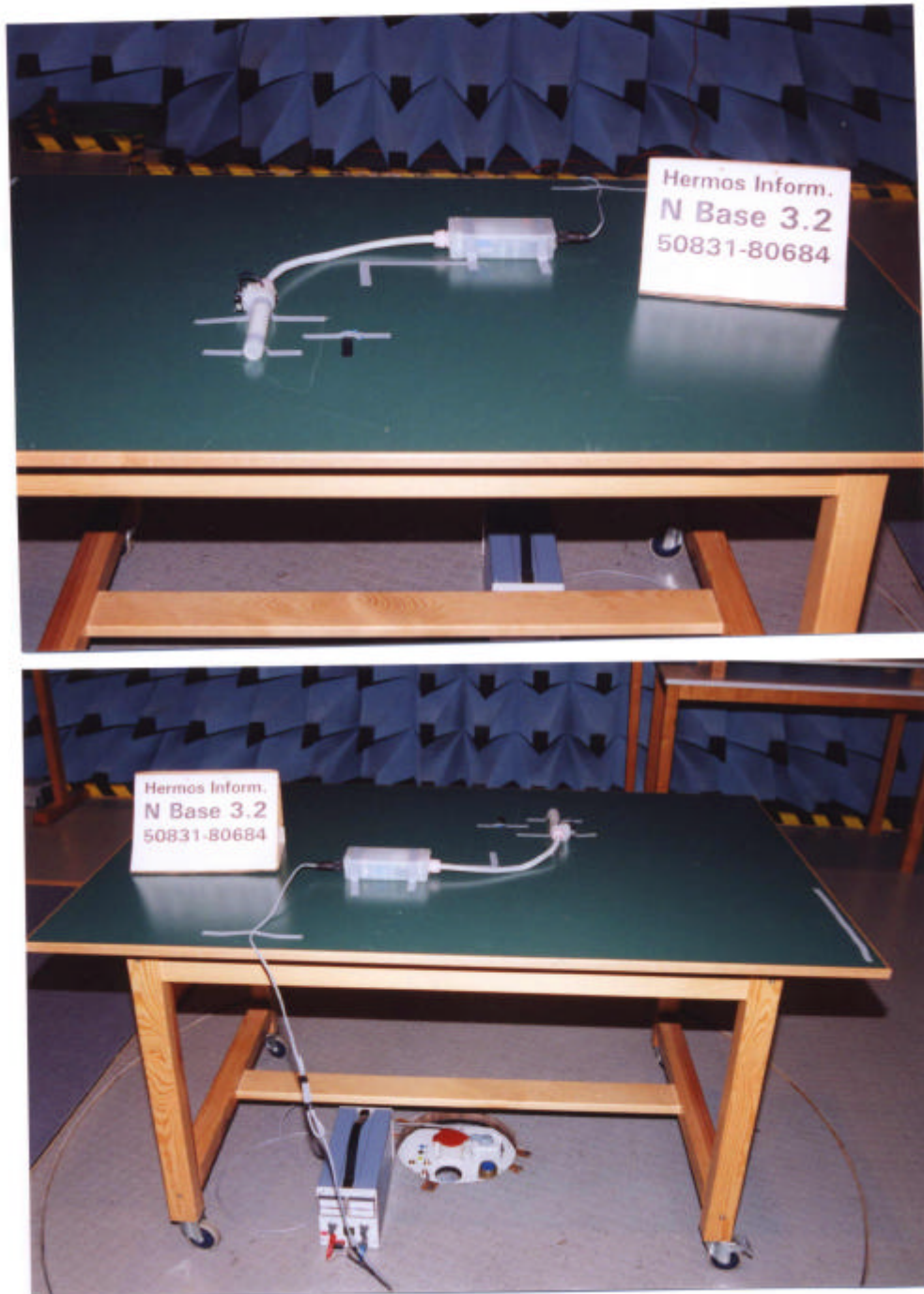
Photo No. 7.2.1 - 7.2.2

Test setup for radiated emission test 9 kHz - 30 MHz



Photos No. 7.2.3 - 7.2.4

**Test setup for radiated emission pre-test 30 MHz - 1 GHz
(semi anechoic room)**



Photos No. 7.2.5 - 7.2.6

**Test setup for radiated emission final test 30 MHz - 1 GHz
(open area test site)**



7.2. Photographs of NBase 3.2 with micro antenna

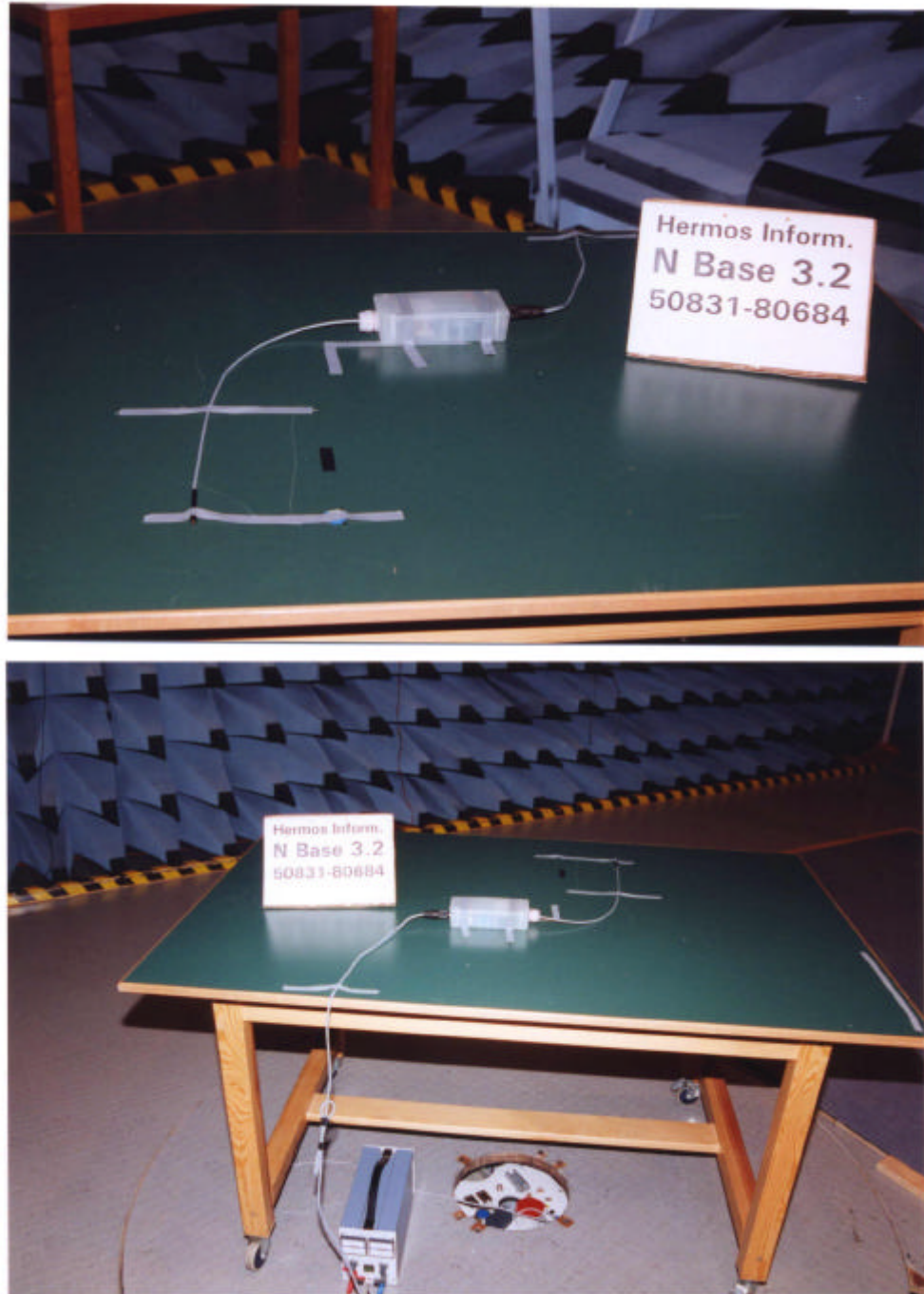
Photo No. 7.2.1 - 7.2.2

Test setup for radiated emission test 9 kHz - 30 MHz



Photos No. 7.2.3 - 7.2.4

**Test setup for radiated emission pre-test 30 MHz - 1 GHz
(semi anechoic room)**



Photos No. 7.2.5 - 7.2.6

**Test setup for radiated emission final test 30 MHz - 1 GHz
(open area test site)**



8. List of Measurements

8.1. List of Measurements According To FCC Part 15 Subpart C

FCC Part 15 Subpart C			
Section(s):	Test	Page(s)	Result
§15.207	Conducted emission test 450 kHz - 30 MHz	---	not applicable (dc supply)
§15.209	Radiated emission test 9 kHz - 30 MHz	28 - 32 42 - 46	passed
§15.209	Radiated emission test 30 MHz - 1 GHz	33 - 40 47 - 55	passed

8.2. List of Measurements According To Industry Canada RSS-210

Industry Canada RSS-210 Issue 2			
Section(s):	Test	Page(s)	Result
6.6, 7.4	Conducted emission test 450 kHz - 30 MHz	---	not applicable (dc supply)
6.2.1	Radiated emission test 9 kHz - 30 MHz	28 - 32 42 - 46	passed
6.2.1, 7.3	Radiated emission test 30 MHz - 1 GHz	33 - 40 47 - 55	passed

9. Referenced Regulations

All tests were performed with reference to the following regulations and standards:

☒	FCC Part 15 Subpart A	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)	October 20, 1997
☐	FCC Part 15 Subpart B	Code of Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Federal Communication Commission (FCC)	October 20, 1997
☒	FCC Part 15 Subpart C	Code of Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Federal Communication Commission (FCC)	October 20, 1997
☒	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz - 40 GHz	October, 1992
☒	RSS-210	Radio Standards Specification RSS-210 Issue 2 for Low Power Licence-Exempt Radiocommunication Devices of Industry Canada	February 24, 1996

10. Test Results

10.1. Test Results for Nbase 3.2 with rod antenna

Radiated Emission Test 9 kHz - 30 MHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Shielded room, cabin no. 2

Tested on:
Test distance 3 metres

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC

Final result without tag:
0.1342 MHz: 119.0 dB μ V/m

- with rod antenna

Detector:

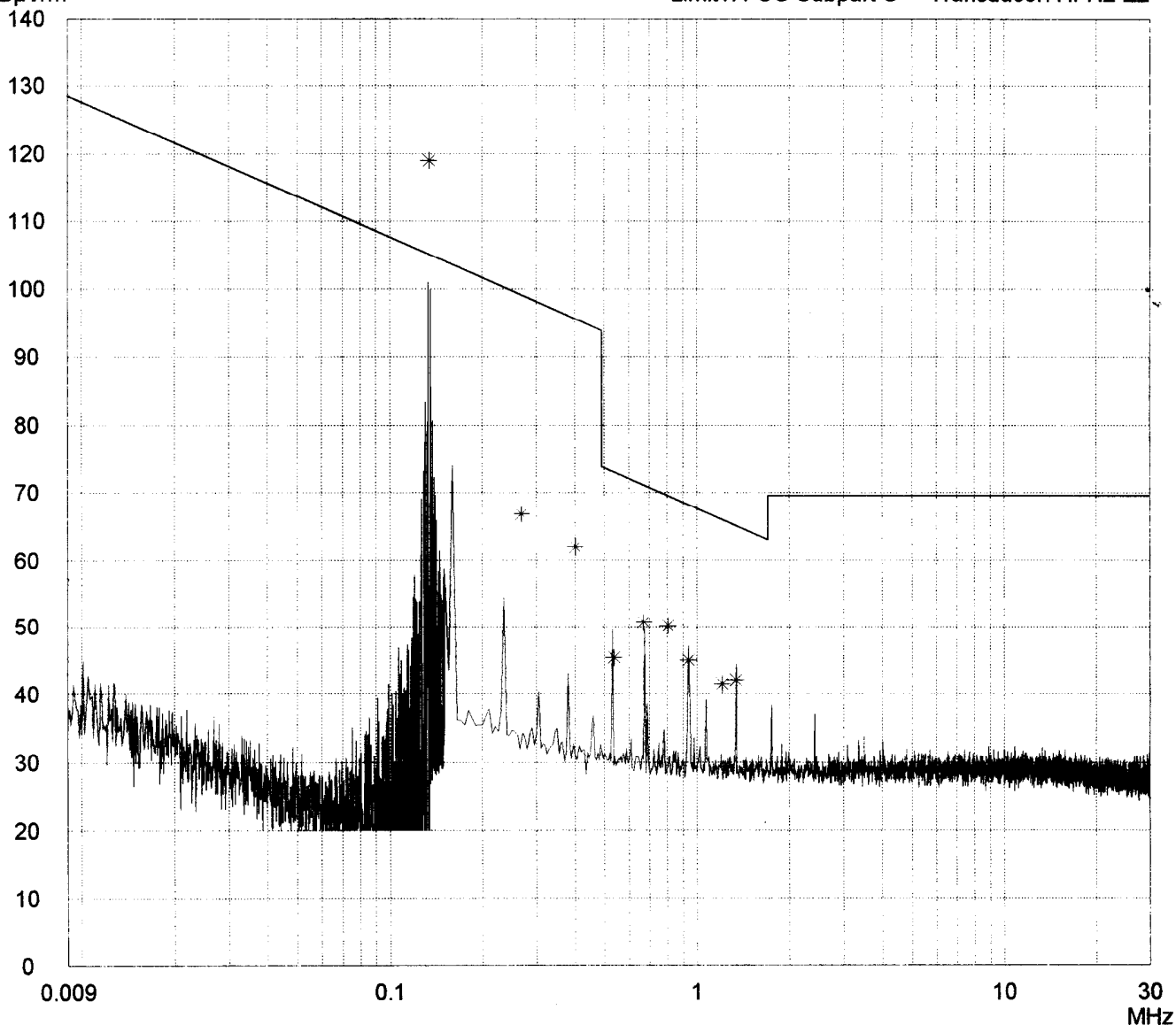
Peak / Final Results: QP

Final results:

Selected by hand

dB μ V/m

Limit1: FCC Subpart C Transducer: HFH2-Z2



Result:
Prescan

Project file:
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**Radiated Emission Test 9 kHz - 30 MHz
according to FCC Part 15 Subpart C**

Model: NBase 3.2	Mode: - reading tag continuously - with supply voltage 24 V DC - with rod antenna
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Shielded room, cabin no. 2	
Tested on: Test distance 3 metres	
Date of test: 07/28/1998	Operator: R. Heller
Test performed: automatically	File name:
Detector: Peak / Final Results: QP	Final results: Selected by hand

<i>Frequency MHz</i>	<i>Reading dBμV</i>	<i>Correction factor dB</i>	<i>Value dBμV/m</i>	<i>Limit dBμV/m</i>	<i>Limit exceeded</i>
0.1342	99.0	20.0	119.0	105.0	*
0.2684	46.8	20.0	66.8	99.0	
0.4026	42.0	20.0	62.0	95.5	
0.5368	25.4	20.0	45.4	73.0	
0.6710	30.7	20.0	50.7	71.1	
0.8050	30.2	20.0	50.2	69.5	
0.9394	25.0	20.0	45.0	68.2	
1.2078	21.5	20.0	41.5	66.0	
1.3420	22.1	20.0	42.1	65.1	

Result: Prescan	Project file: 50831-80684	Page 29 of 55 Pages
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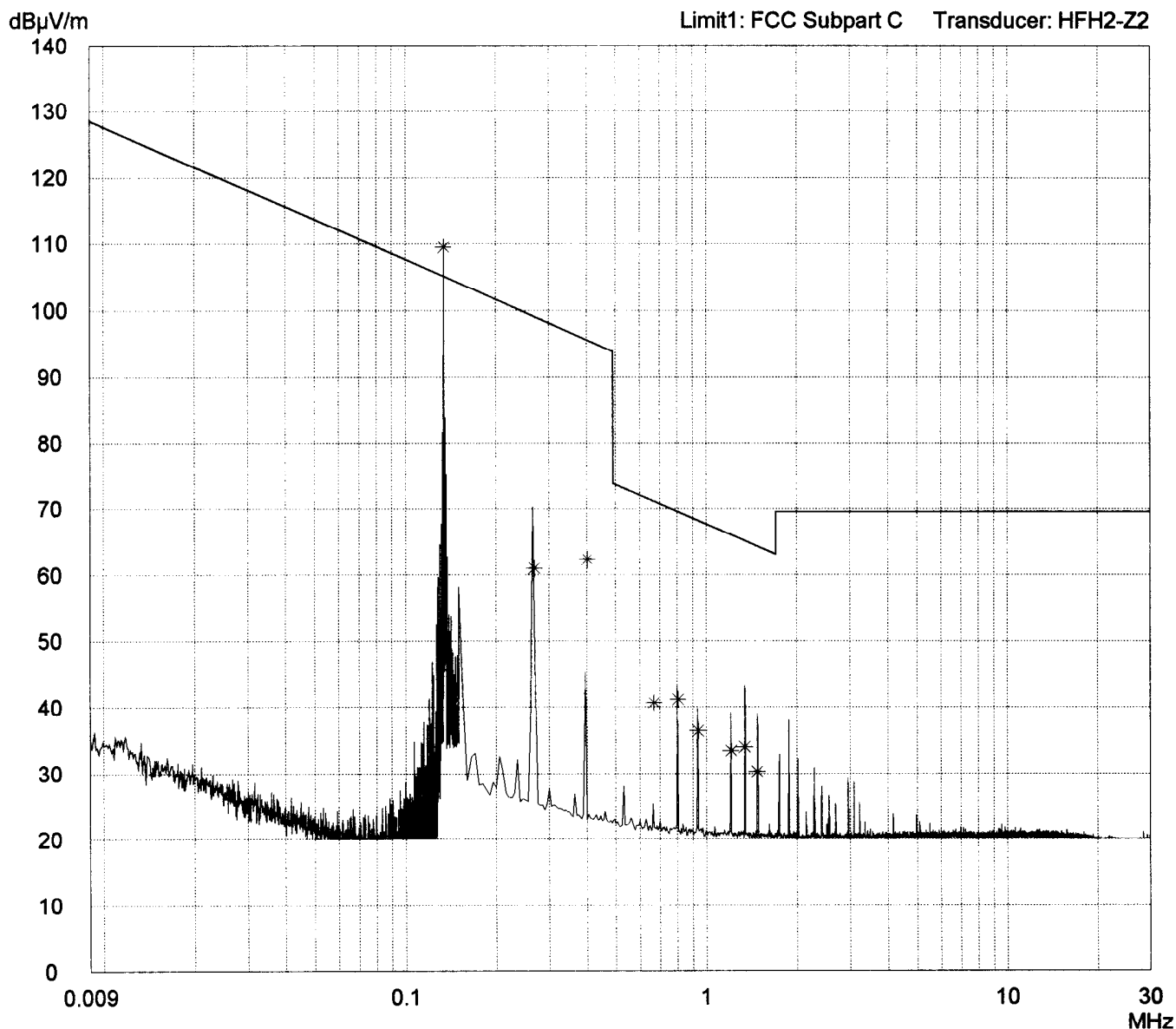
Radiated Emission Test 9 kHz - 30 MHz according to FCC Part 15 Subpart C

Model: NBase 3.2	
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Shielded room, cabin no. 2	
Tested on: Test distance 3 metres	
Date of test: 07/28/1998	Operator: R. Heller
Test performed: automatically	File name:

Mode: - reading tag continuously (distance 10 cm) - with supply voltage 24 V DC Final result without tag: 0.1342 MHz: 109.5 dB μ V/m - with rod antenna
--

Detector: Average / Final Results: AV

Final results: Selected by hand



Result: Prescan

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**Radiated Emission Test 9 kHz - 30 MHz
according to FCC Part 15 Subpart C**

Model: NBase 3.2	Mode: - reading tag continuously (distance 10 cm) - with supply voltage 24 V DC Final result without tag: 0.1342 MHz: 109.5 dBµV/m - with rod antenna
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Shielded room, cabin no. 2	
Tested on: Test distance 3 metres	
Date of test: 07/28/1998	Operator: R. Heller
Test performed: automatically	File name:
Detector: Average / Final Results: AV	Final results: Selected by hand

<i>Frequency MHz</i>	<i>Reading dBμV</i>	<i>Correction factor dB</i>	<i>Value dBμV/m</i>	<i>Limit dBμV/m</i>	<i>Limit exceeded</i>
0.1342	89.5	20.0	109.5	105.0	*
0.2684	41.0	20.0	61.0	99.0	
0.4026	42.3	20.0	62.3	95.5	
0.6710	20.7	20.0	40.7	71.1	
0.8052	21.2	20.0	41.2	69.5	
0.9394	16.4	20.0	36.4	68.2	
1.2078	13.4	20.0	33.4	66.0	
1.3420	14.0	20.0	34.0	65.1	
1.4762	10.3	20.0	30.3	64.2	

Result: Prescan	Project file: 50831-80684	Page 31 of 55 Pages
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Radiated Emission Test 9 kHz - 30 MHz **according to FCC Part 15 Subpart C, §15.209**

Model: NBase 3.2
Type: Transponder reader system
Serial No.: Prototype no. 1
Applicant: Hermos Informatik GmbH
Test-site: Open area test-site
Test distances: 10 meters and 30 meters
Date of test: 08/21/1998
Operator: R. Heller

Mode: - reading tag continuously (distance 10 cm)
 - with supply voltage 24 V DC
 - with rod antenna

Frequency [MHz]	Detector	Measuring Bandwidth [kHz]	Received Voltage		Correction [dB]	Fieldstrength			Limit [dBµV/m]
			10 m [dBµV]	30 m [dBµV]		10 m [dBµV/m]	30 m [dBµV/m]	300 m [dBµV/m]	
0.134	QP	0.2	66.3	44.2	20.0	86.3	64.2	17.9	
0.134	AV	0.2	57.1	35.1	20.0	77.1	55.1	9.0	25.1

Note 1: Fieldstrength value in 300 meters distance is extrapolated according to §15.31 f(2) performing two measurements in 10 and 30 meters distance
Note 2: Frequencies are selected according to prescan in shielded room with test distance 3 meters
Result: The limits are kept.

Radiated Emission Test 30 MHz - 300 MHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Semi anechoic room, cabin no. 3

Tested on:
Test distance 3 meters
Horizontal Polarization

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- readin tag continuously (distance 10 cm)
- with supply voltage 24 V DC

- with rod antenna

Detector:
Peak

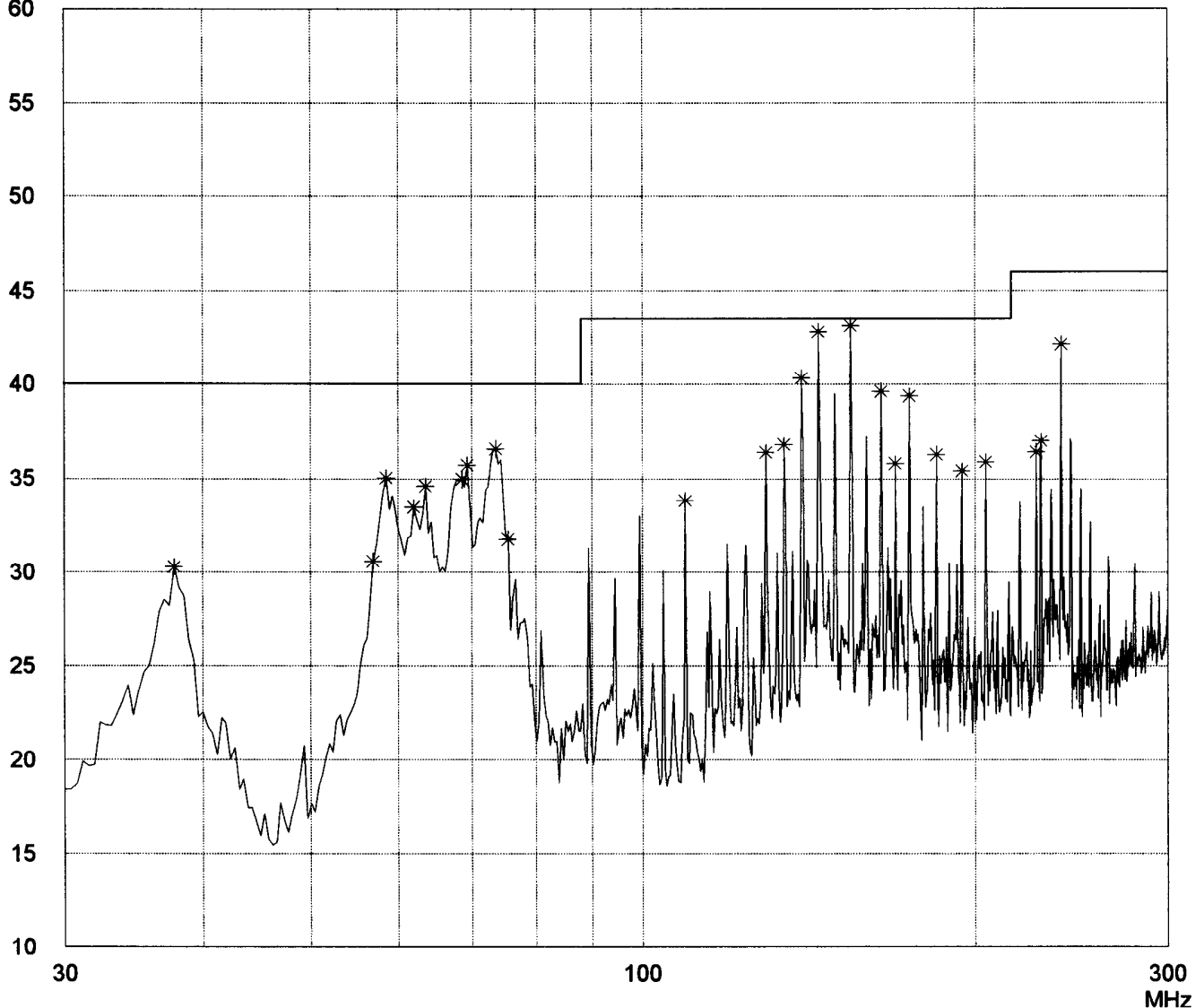
List of values:

10 dB Margin

50 Subranges

dB μ V/m
60

Limit1: FCC Subpart C Transducer: HK 116



Result:
Prescan

Project file:
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Radiated Emission Test 300 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Semi anechoic room, cabin no. 3

Tested on:
Test distance 3 meters
Horizontal Polarization

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- readin tag continuously (distance 10 cm)
- with supply voltage 24 V DC

- with rod antenna

Detector:
Peak

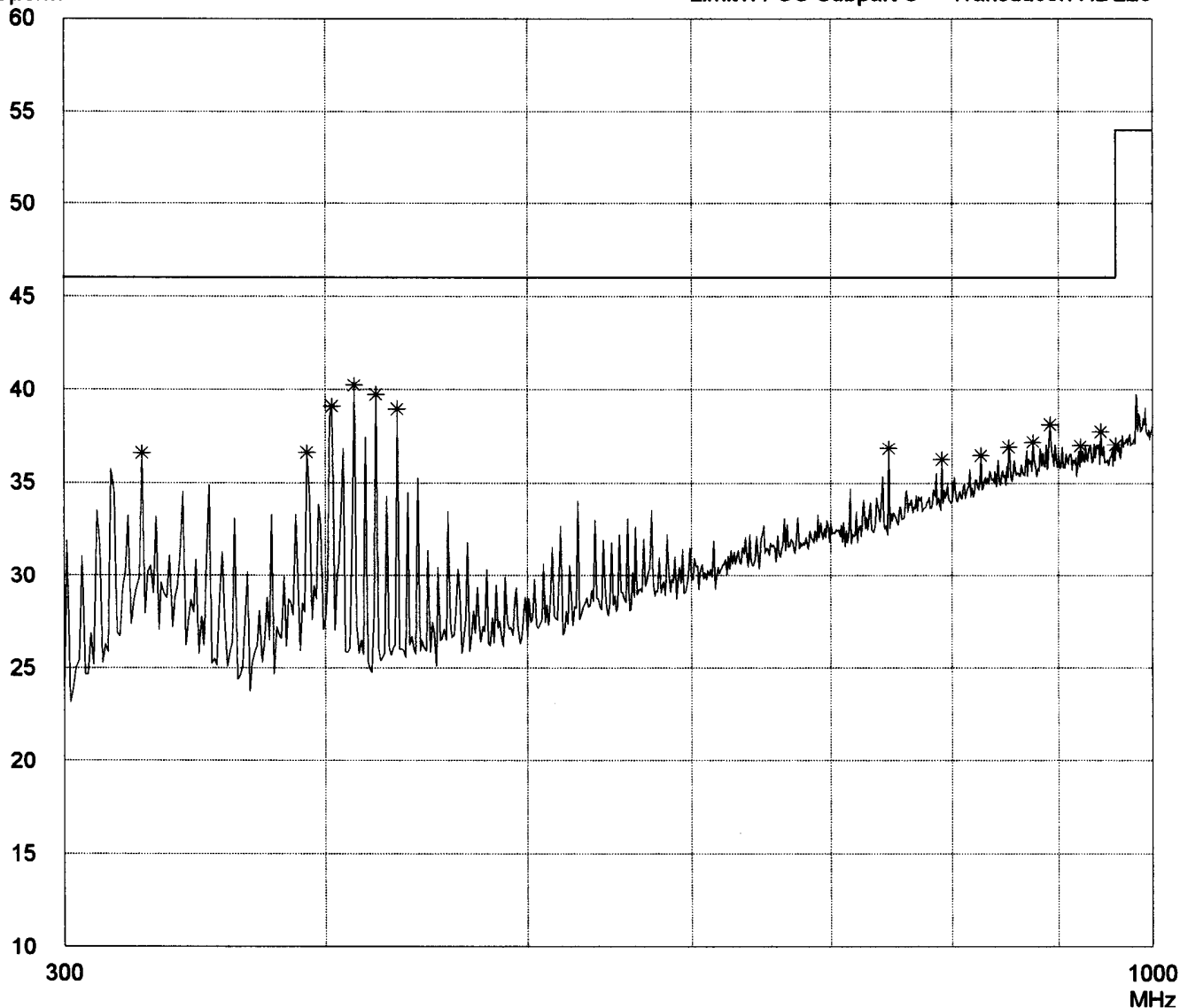
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Subpart C Transducer: HL 223



Result:
Prescan

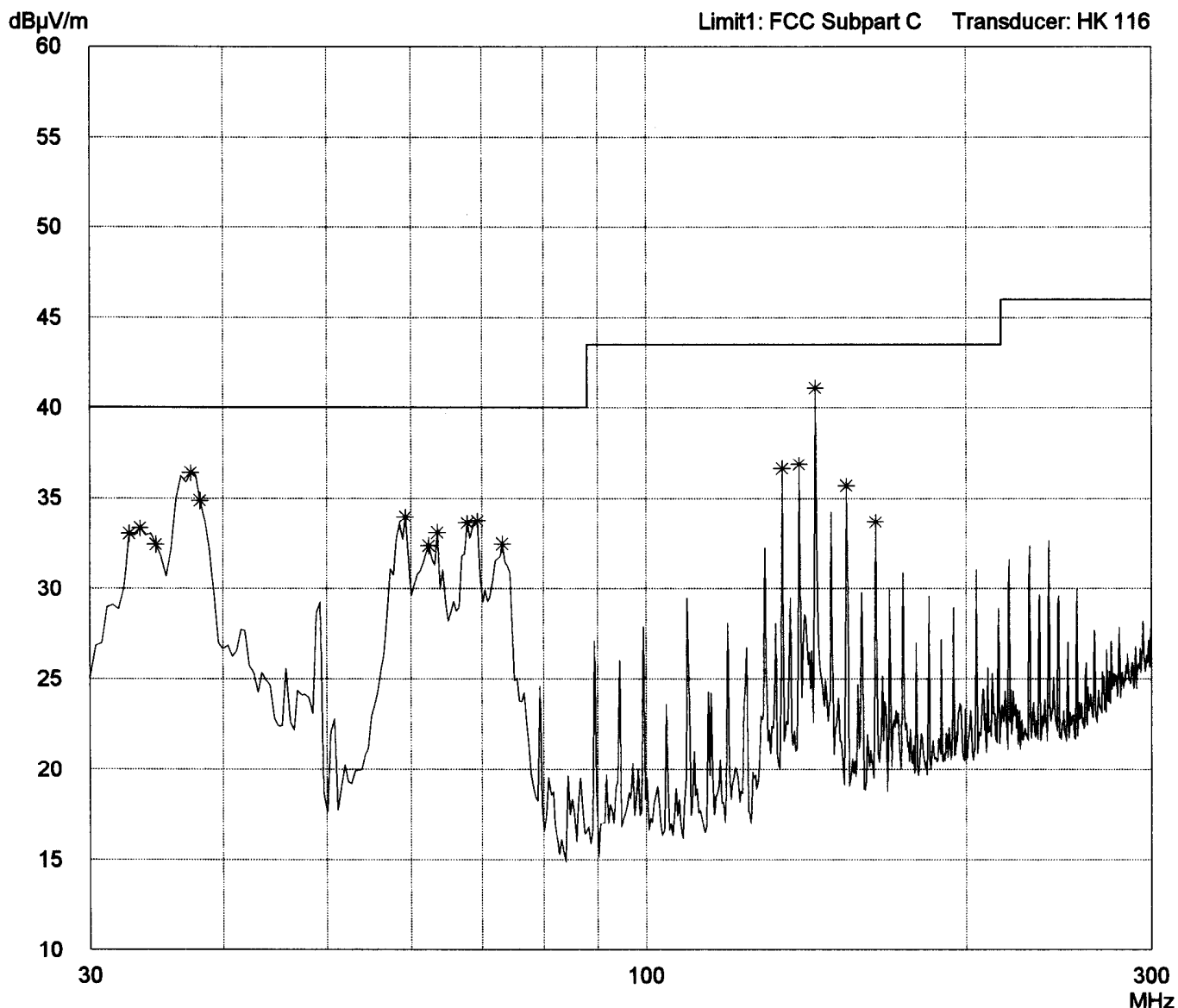
Project file:
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Radiated Emission Test 30 MHz - 300 MHz according to FCC Part 15 Subpart C

Model: NBase 3.2	Mode: - readin tag continuously (distance 10 cm) - with supply voltage 24 V DC - with rod antenna
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Semi anechoic room, cabin no. 3	
Tested on: Test distance 3 meters Vertical Polarization	
Date of test: 07/28/1998	Operator: R. Heller
Test performed: automatically	File name:

Detector: Peak	List of values: 10 dB Margin 50 Subranges
---------------------------------	---



Result: Prescan	Project file: 50831-80684
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Radiated Emission Test 300 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Semi anechoic room, cabin no. 3

Tested on:
Test distance 3 meters
Vertical Polarization

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:
- readin tag continuously (distance 10 cm)
- with supply voltage 24 V DC

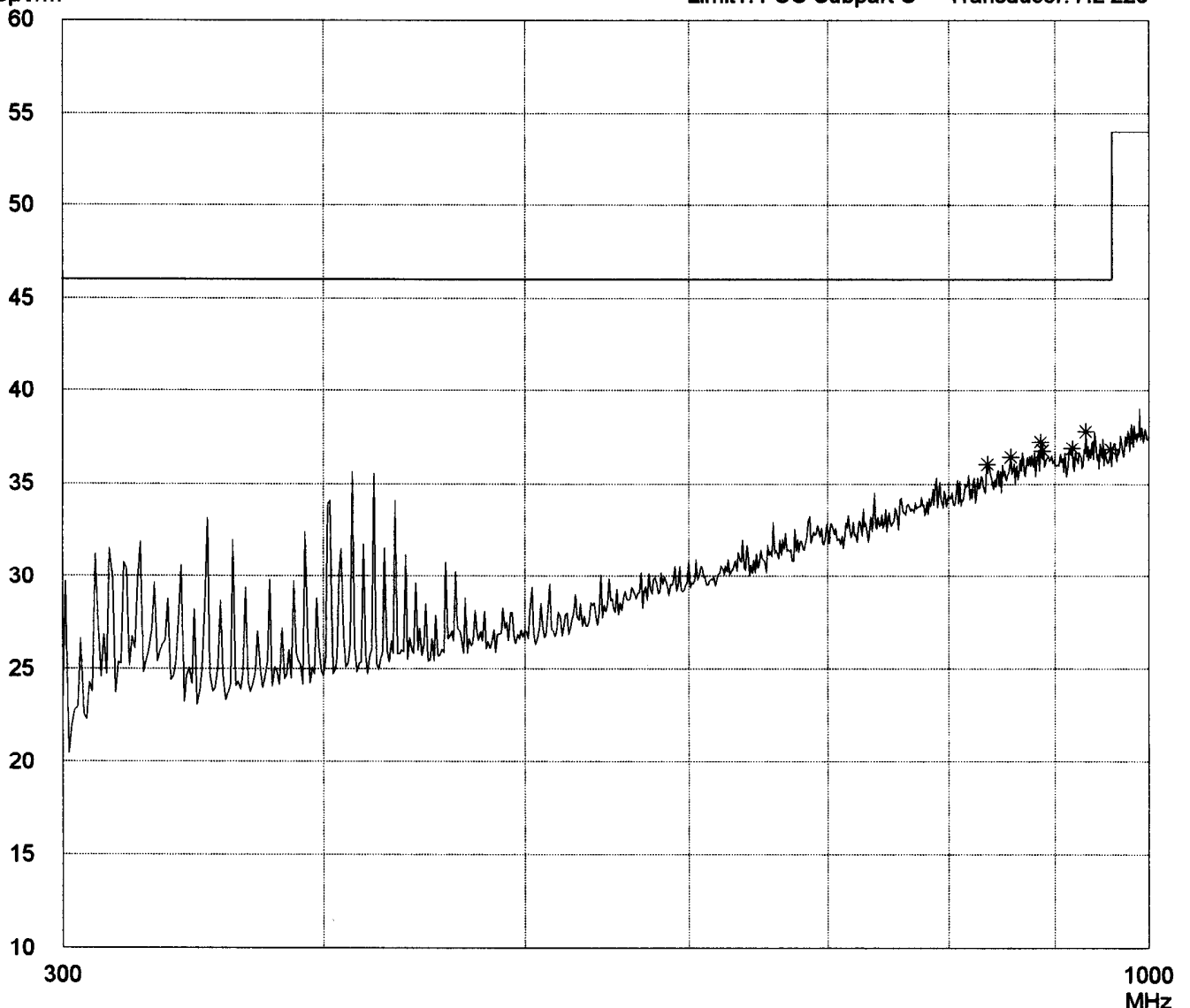
- with rod antenna

Detector:
Peak

List of values:
10 dB Margin 50 Subranges

dBµV/m

Limit1: FCC Subpart C Transducer: HL 223



Result:
Prescan

Project file:
50831-80684

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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Open area test-site I

Tested on:
Test distance 3 meters
Horizontal Polarization

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
by hand

File name:

Mode:

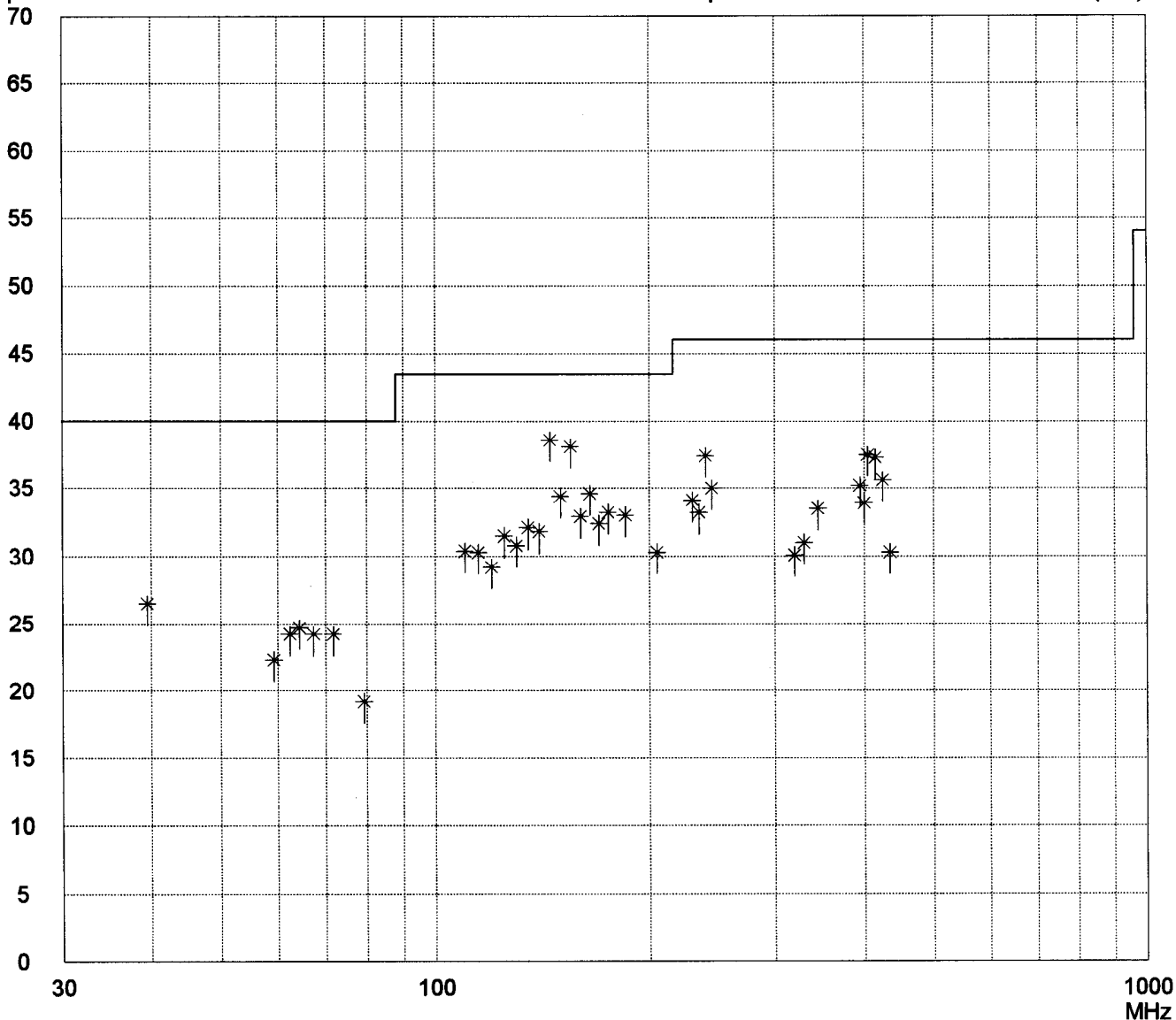
- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC
- with rod antenna

Detector:
Quasi-Peak

List of values:
Selected by hand

dB μ V/m

Limit1: FCC Subpart C Transducer: HK116 / HL223 (3 m)



Result:
Limit kept

Project file:
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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model: NBase 3.2	
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Open area test-site I	
Tested on: Test distance 3 meters Horizontal Polarization	
Date of test: 07/28/1998	Operator: R. Heller
Test performed: by hand	File name:

Mode: - reading tag continuously (distance 10 cm) - with supply voltage 24 V DC - with rod antenna
--

Detector: Quasi-Peak

List of values: Selected by hand
--

Frequency MHz	Reading dBµV	Correction factor dB	Value dBµV/m	Limit dBµV/m	Limit exceeded
39.5	14.0	12.5	26.5	40.0	
59.3	12.0	10.3	22.3	40.0	
62.4	14.0	10.2	24.2	40.0	
64.4	14.5	10.2	24.7	40.0	
67.4	14.0	10.2	24.2	40.0	
71.8	14.0	10.2	24.2	40.0	
79.3	9.0	10.2	19.2	40.0	
110.0	18.0	12.4	30.4	43.5	
115.0	17.5	12.8	30.3	43.5	
120.0	16.0	13.2	29.2	43.5	
125.0	18.0	13.5	31.5	43.5	
130.0	17.0	13.8	30.8	43.5	
135.0	18.0	14.1	32.1	43.5	
140.0	17.5	14.3	31.8	43.5	
145.0	24.0	14.6	38.6	43.5	
150.0	19.5	14.9	34.4	43.5	
155.0	23.0	15.1	38.1	43.5	
160.0	17.5	15.4	32.9	43.5	
165.0	19.0	15.6	34.6	43.5	
170.0	16.5	15.9	32.4	43.5	
175.0	17.0	16.2	33.2	43.5	
185.0	16.5	16.5	33.0	43.5	
205.0	13.0	17.3	30.3	43.5	
230.0	16.0	18.1	34.1	46.0	
235.0	15.0	18.2	33.2	46.0	
240.0	19.0	18.4	37.4	46.0	
245.0	16.5	18.5	35.0	46.0	
320.0	12.5	17.6	30.1	46.0	
330.0	13.0	18.0	31.0	46.0	
345.0	15.0	18.5	33.5	46.0	
395.0	15.0	20.2	35.2	46.0	
400.0	13.5	20.4	33.9	46.0	
405.0	17.0	20.5	37.5	46.0	
415.0	16.5	20.8	37.3	46.0	
425.0	14.5	21.1	35.6	46.0	
435.0	9.0	21.3	30.3	46.0	

Result: Limit kept

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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Open area test-site I

Tested on:
Test distance 3 meters
Vertical Polarization

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
by hand

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC
- with rod antenna

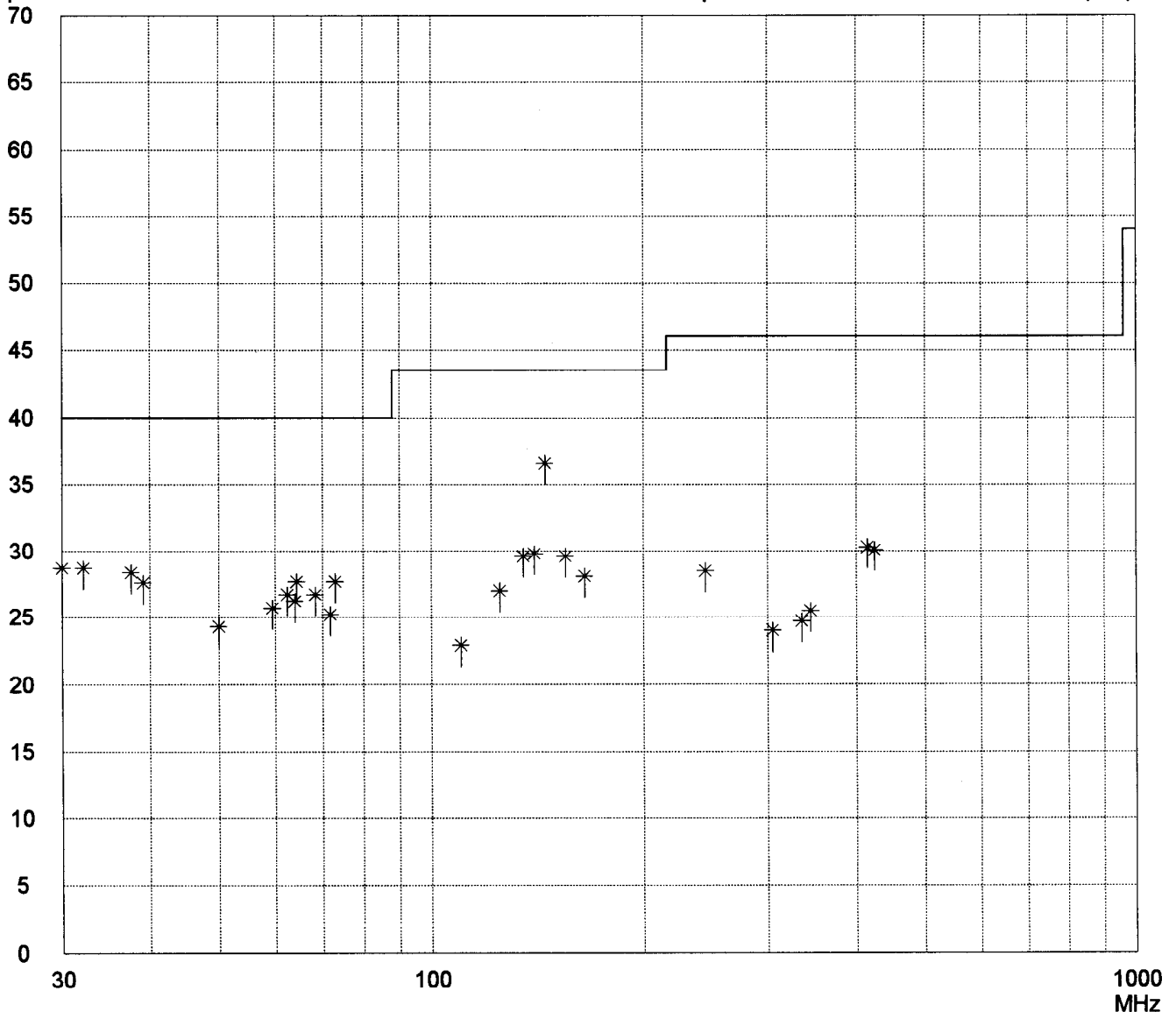
Detector:
Quasi-Peak

List of values:
Selected by hand

dB μ V/m

Limit1: FCC Subpart C

Transducer: HK116 / HL223 (3 m)



Result:
Limit kept

Project file:
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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model: NBase 3.2	
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Open area test-site I	
Tested on: Test distance 3 meters Vertical Polarization	
Date of test: 07/28/1998	Operator: R. Heller
Test performed: by hand	File name:

Mode: - reading tag continuously (distance 10 cm) - with supply voltage 24 V DC - with rod antenna
--

Detector: Quasi-Peak

List of values: Selected by hand
--

Frequency MHz	Reading dBµV	Correction factor dB	Value dBµV/m	Limit dBµV/m	Limit exceeded
30.0	14.0	14.7	28.7	40.0	
32.2	14.5	14.2	28.7	40.0	
37.6	15.5	12.9	28.4	40.0	
39.1	15.0	12.6	27.6	40.0	
50.0	13.5	10.8	24.3	40.0	
59.5	15.5	10.2	25.7	40.0	
62.4	16.5	10.2	26.7	40.0	
64.0	16.0	10.2	26.2	40.0	
64.4	17.5	10.2	27.7	40.0	
68.4	16.5	10.2	26.7	40.0	
71.8	15.0	10.2	25.2	40.0	
73.0	17.5	10.2	27.7	40.0	
110.0	10.5	12.4	22.9	43.5	
125.0	13.5	13.5	27.0	43.5	
135.0	15.5	14.1	29.6	43.5	
140.0	15.5	14.3	29.8	43.5	
145.0	22.0	14.6	36.6	43.5	
155.0	14.5	15.1	29.6	43.5	
165.0	12.5	15.6	28.1	43.5	
245.0	10.0	18.5	28.5	46.0	
305.0	7.0	17.0	24.0	46.0	
335.0	6.5	18.2	24.7	46.0	
345.0	7.0	18.5	25.5	46.0	
415.0	9.5	20.8	30.3	46.0	
425.0	9.0	21.1	30.1	46.0	

Result: Limit kept

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10.2. Test Results for Nbase 3.2 with micro antenna

Radiated Emission Test 9 kHz - 30 MHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Shielded room, cabin no. 2

Tested on:
Test distance 3 metres

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC
- with micro antenna

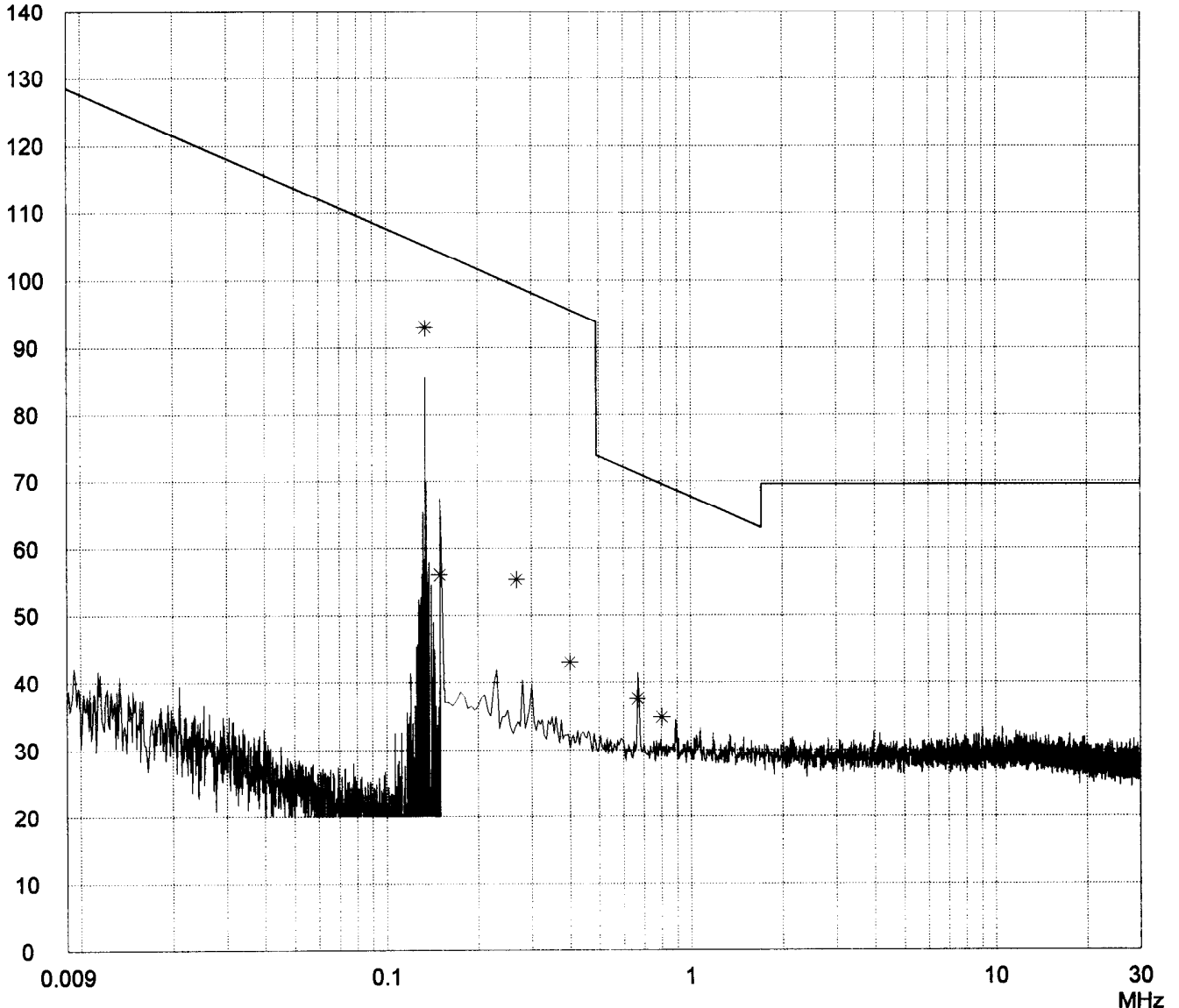
Final results without tag:
0.1342 MHz: 93.0 dB μ V/m

Detector:
Peak / Final Results: QP

Final results:
Selected by hand

dB μ V/m

Limit1: FCC Subpart C Transducer: HFH2-Z2



Result:
Prescan

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**Radiated Emission Test 9 kHz - 30 MHz
according to FCC Part 15 Subpart C**

Model: NBase 3.2		Mode: - reading tag continuously (distance 10 cm) - with supply voltage 24 V DC - with micro antenna Final results without tag: 0.1342 MHz: 93.0 dBµV/m
Serial no.: Prototype 1		
Applicant: Hermos Informatik GmbH		
Test site: Shielded room, cabin no. 2		
Tested on: Test distance 3 metres		
Date of test: 07/28/1998	Operator: R. Heller	
Test performed: automatically	File name:	

Detector: Peak / Final Results: QP	Final results: Selected by hand
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[illegible]

Result: Prescan	Project file: 50831-80684	Page 43 of 55 Pages
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Radiated Emission Test 9 kHz - 30 MHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Shielded room, cabin no. 2

Tested on:
Test distance 3 metres

Date of test:
07/28/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC

- with micro antenna

Final results without tag:

0.1342 MHz: 83.4 dB μ V/m

Detector:

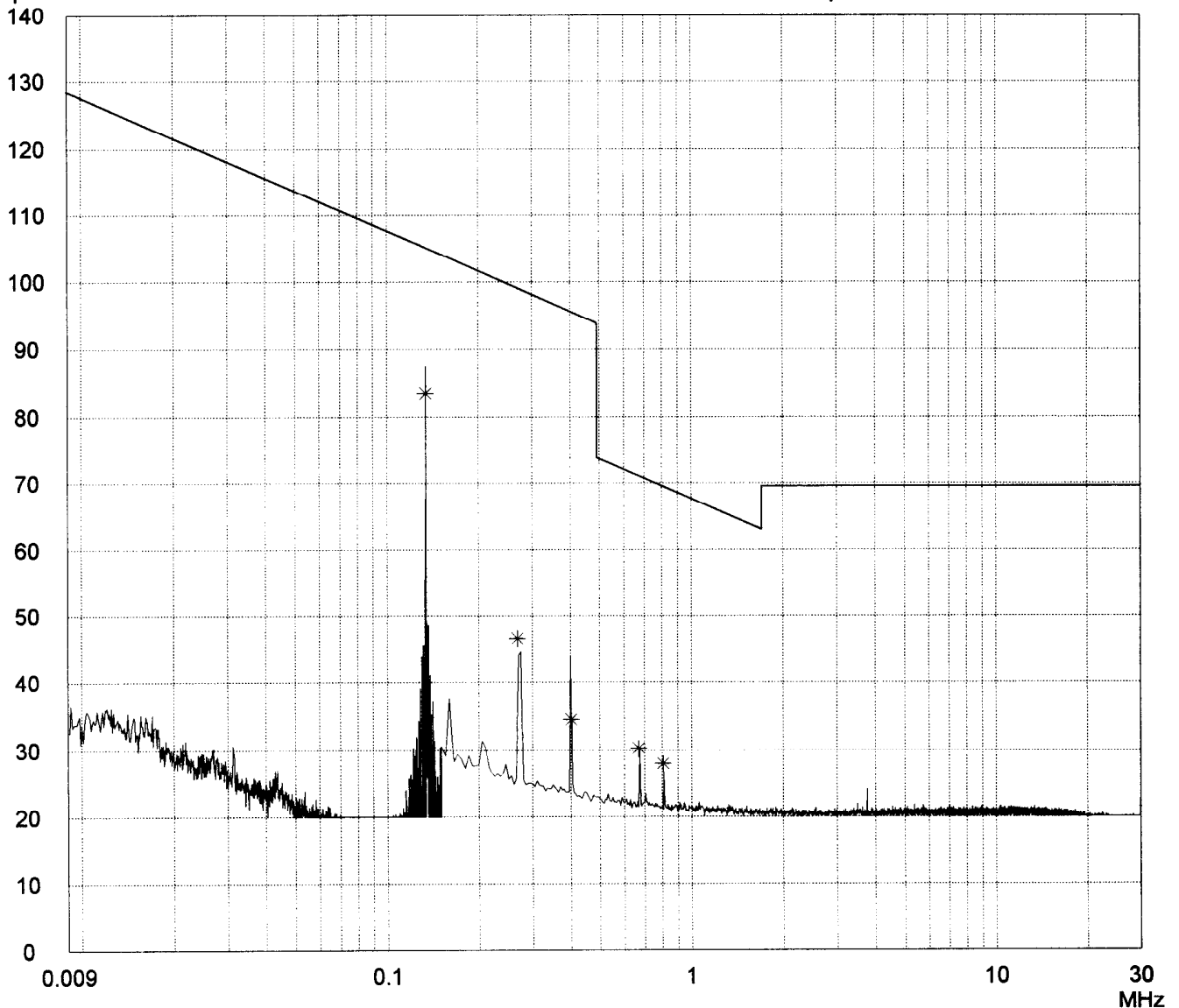
Average / Final Results: AV

Final results:

Selected by hand

dB μ V/m

Limit1: FCC Subpart C Transducer: HFH2-Z2



Result:
Prescan

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Radiated Emission Test 9 kHz - 30 MHz **according to FCC Part 15 Subpart C, §15.209**

Model: NBase 3.2
Type: Transponder reader system
Serial No.: Prototype no. 1
Applicant: Hermos Informatik GmbH
Test-site: Open area test-site
Test distances: 3 meters and 10 meters
Date of test: 08/21/1998
Operator: R. Heller

Mode: - reading tag continuously (distance 10 cm)
 - with supply voltage 24 V DC
 - with micro antenna

Frequency [MHz]	Detector	Measuring Bandwidth [kHz]	Received Voltage		Correction [dB]	Fieldstrength			Limit [dBµV/m]
			3 m [dBµV]	10 m [dBµV]		3 m [dBµV/m]	10 m [dBµV/m]	300 m [dBµV/m]	
0.134	QP	0.2	71.8	44.5	20.0	91.8	64.5	-12.6	
0.134	AV	0.2	60.6	34.6	20.0	80.6	54.6	-18.8	25.1

Note 1: Fieldstrength value in 300 meters distance is extrapolated according to §15.31 f(2) performing two measurements in 3 and 10 meters distance

Note 2: Frequencies are selected according to prescan in shielded room with test distance 3 meters

Result: The limits are kept.

Radiated Emission Test 30 MHz - 300 MHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Semi anechoic room, cabin no. 3

Tested on:
Test distance 3 meters
Horizontal Polarization

Date of test:
07/30/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC

- with micro antenna

Detector:
Peak

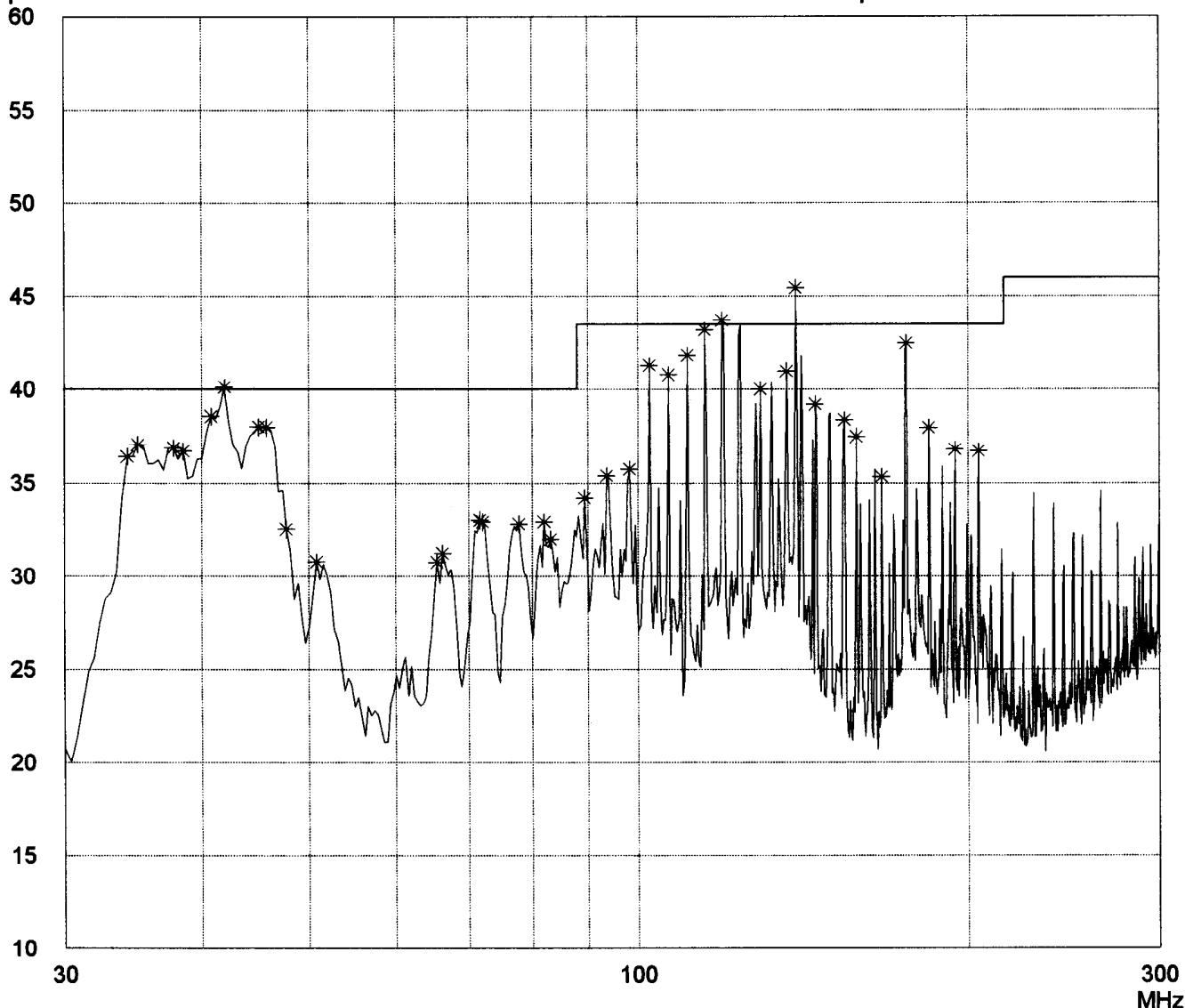
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Subpart C Transducer: HK 116



Result:
Prescan

Project file:
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Radiated Emission Test 300 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Semi anechoic room, cabin no. 3

Tested on:
Test distance 3 meters
Horizontal Polarization

Date of test:
07/30/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC
- with micro antenna

Detector:
Peak

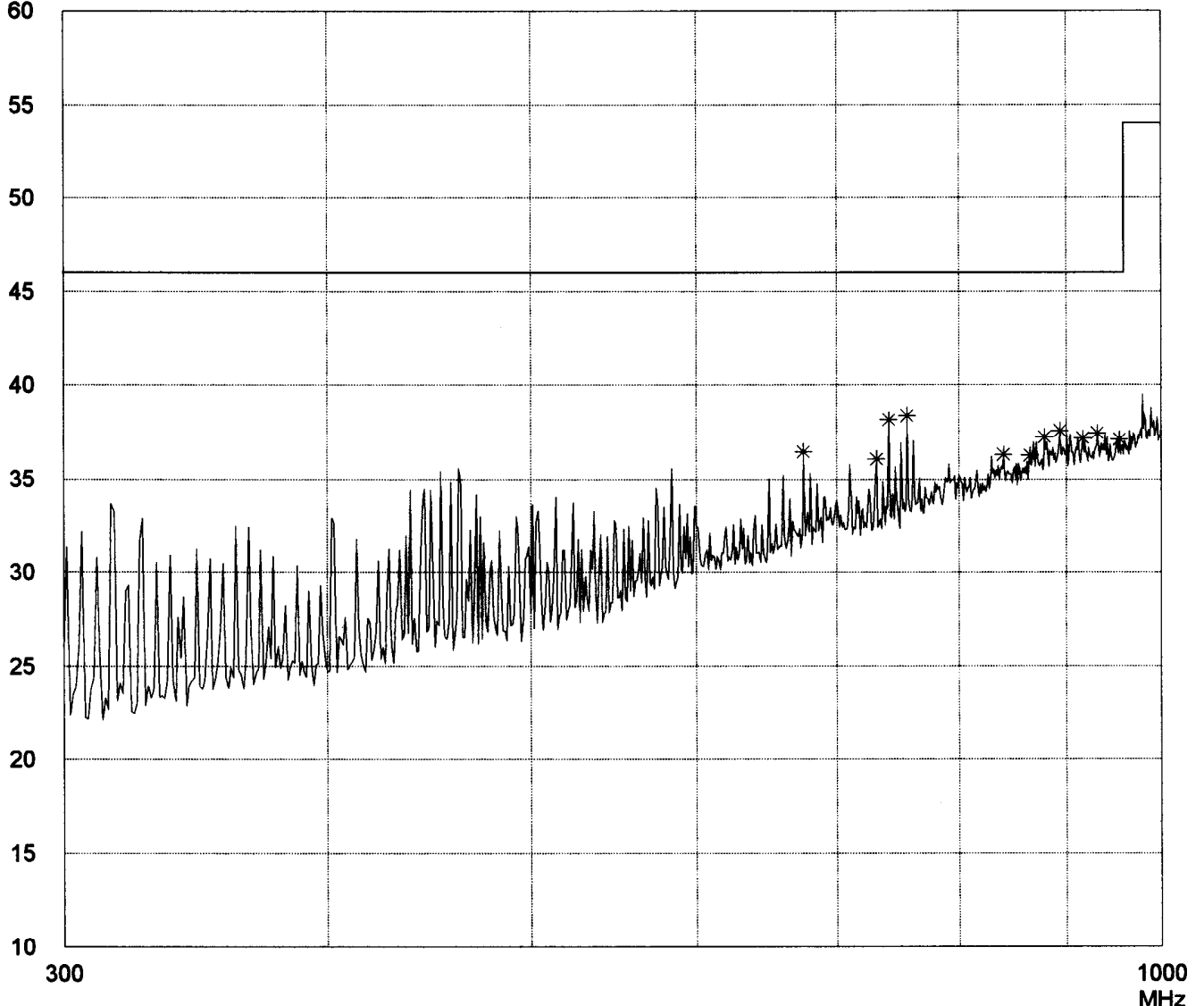
List of values:

10 dB Margin

50 Subranges

dBµV/m
60

Limit1: FCC Subpart C Transducer: HL 223



Result:
Prescan

Project file:
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Radiated Emission Test 30 MHz - 300 MHz according to FCC Part 15 Subpart C

Model:

NBase 3.2

Serial no.:

Prototype 1

Applicant:

Hermos Informatik GmbH

Test site:

Semi anechoic room, cabin no. 3

Tested on:

Test distance 3 meters
Vertical Polarization

Date of test:

07/30/1998

Operator:

R. Heller

Test performed:

automatically

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC

- with micro antenna

Detector:

Peak

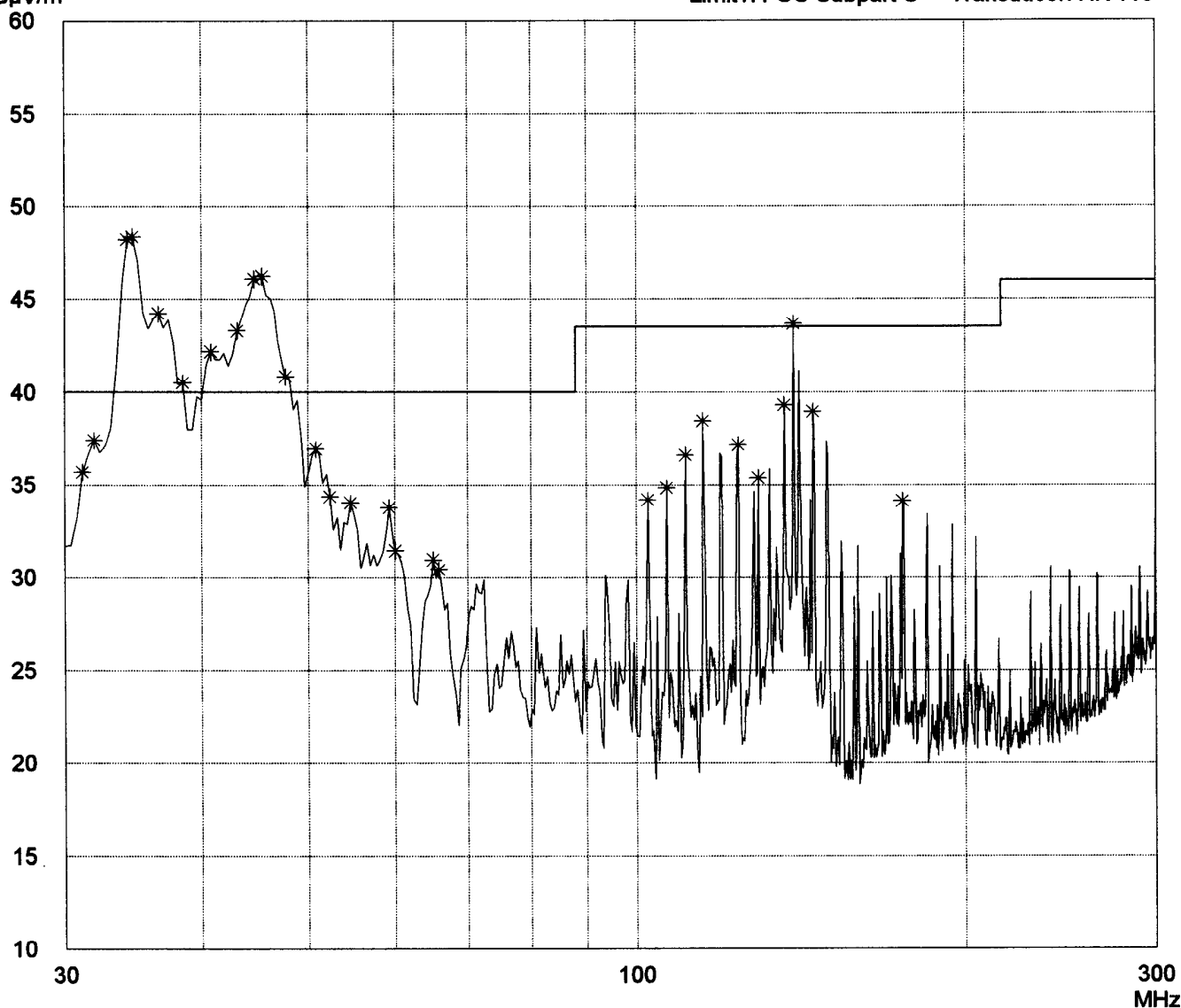
List of values:

10 dB Margin

50 Subranges

dB μ V/m

Limit1: FCC Subpart C Transducer: HK 116



Result:

Prescan

Project file:

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Radiated Emission Test 300 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:
NBase 3.2

Serial no.:
Prototype 1

Applicant:
Hermos Informatik GmbH

Test site:
Semi anechoic room, cabin no. 3

Tested on:
Test distance 3 meters
Vertical Polarization

Date of test:
07/30/1998

Operator:
R. Heller

Test performed:
automatically

File name:

Mode:

- reading tag continuously (distance 10 cm)
- with supply voltage 24 V DC
- with micro antenna

Detector:
Peak

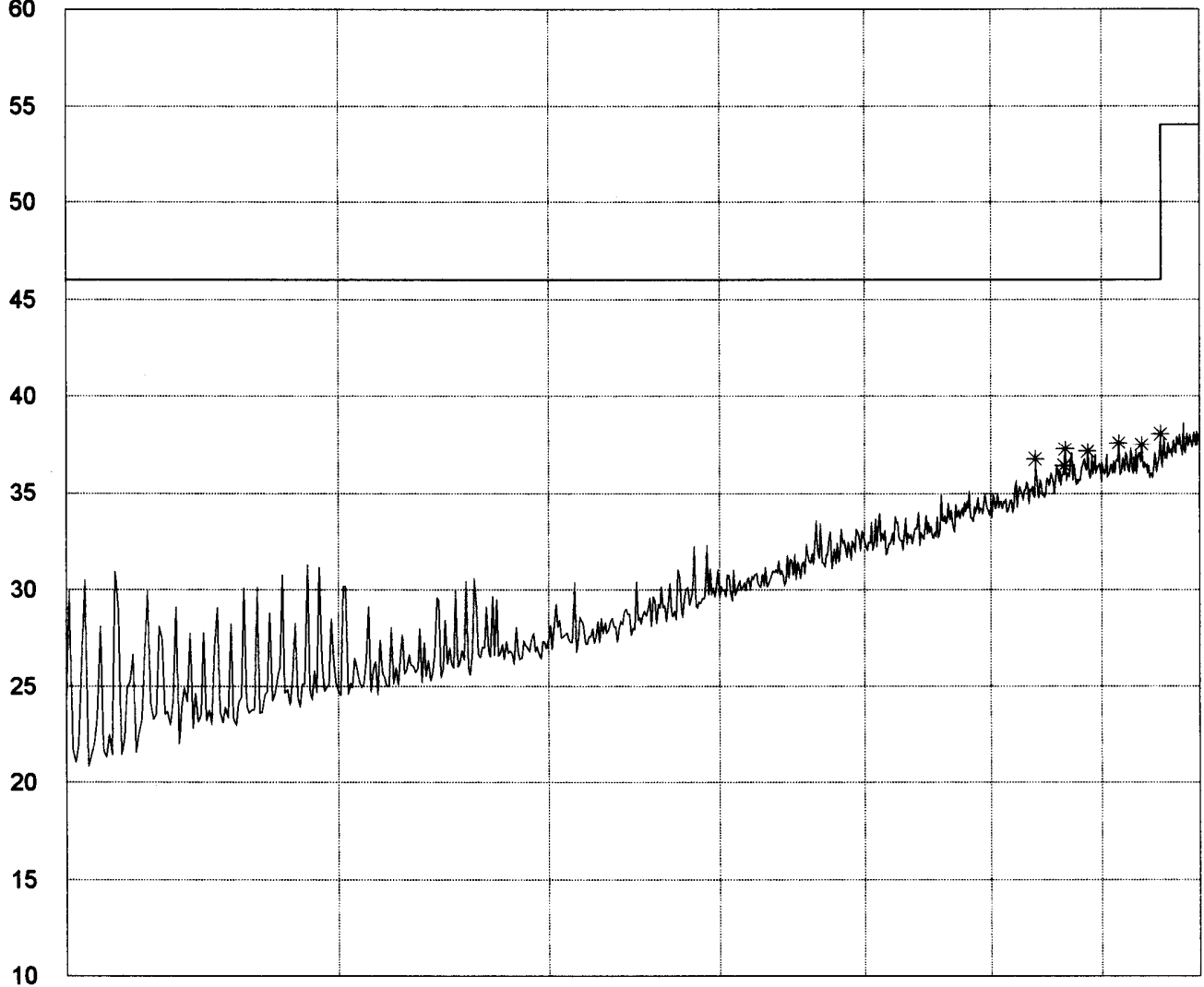
List of values:

10 dB Margin

50 Subranges

dB μ V/m
60

Limit1: FCC Subpart C Transducer: HL 223



300

1000
MHz

Result:
Prescan

Project file:
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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:

NBase 3.2

Serial no.:

Prototype 1

Applicant:

Hermos Informatik GmbH

Test site:

Open area test-site I

Tested on:

Test distance 3 meters

Horizontal Polarization

Date of test:

07/30/1998

Operator:

R. Heller

Test performed:

by hand

File name:

Mode:

- reading tag continuously (distance 10 cm)

- with supply voltage 24 V DC

- with micro antenna

Detector:

Quasi-Peak

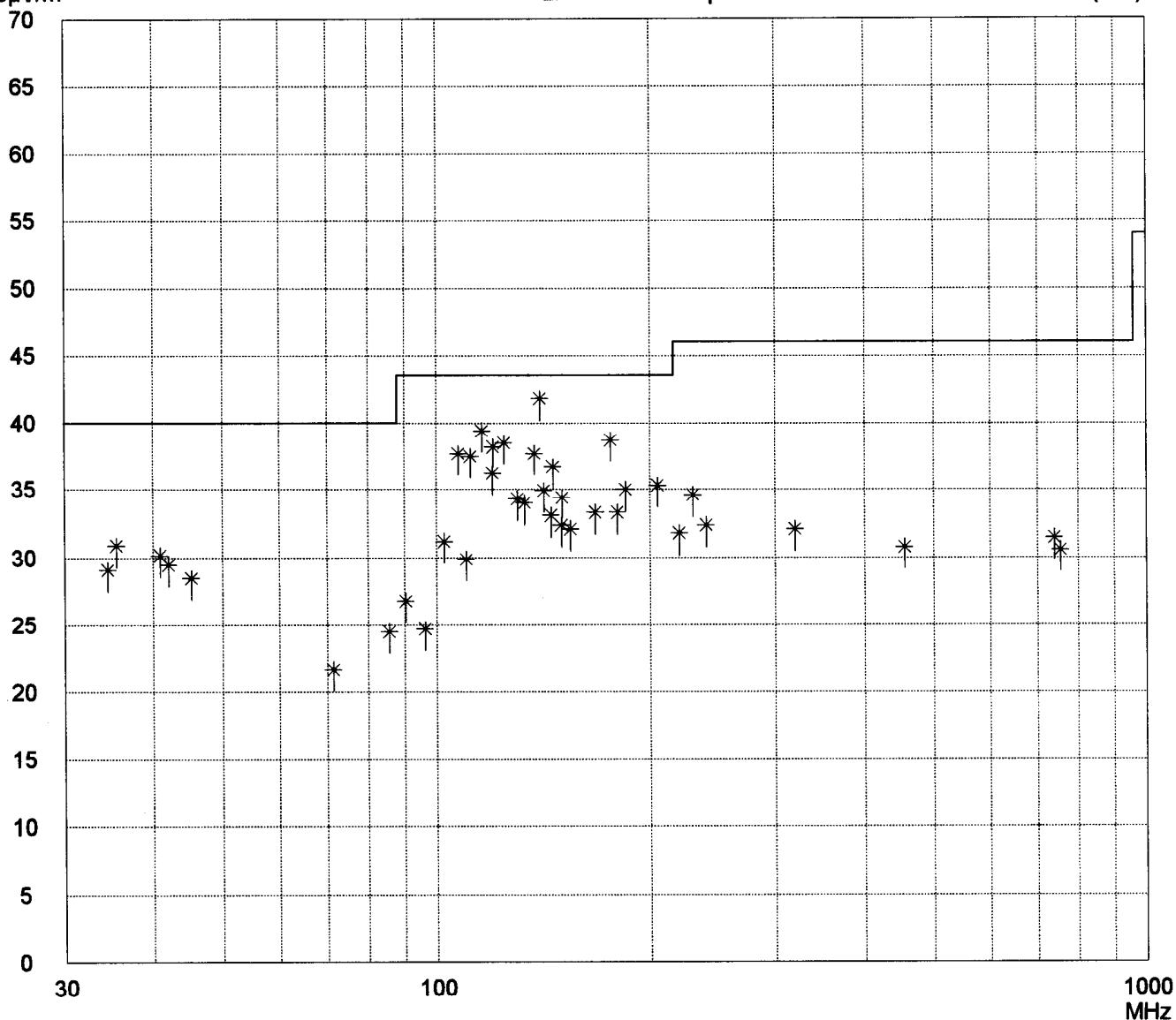
List of values:

Selected by hand

dB μ V/m

Limit1: FCC Subpart C

Transducer: HK116 / HL223 (3 m)



Result:

Limit kept

Project file:

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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model: NBase 3.2	
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Open area test-site I	
Tested on: Test distance 3 meters Horizontal Polarization	
Date of test: 07/30/1998	Operator: R. Heller
Test performed: by hand	File name:

Mode: - reading tag continuously (distance 10 cm) - with supply voltage 24 V DC - with micro antenna
--

Detector: Quasi-Peak

List of values: Selected by hand
--

Frequency MHz	Reading dBµV	Correction factor dB	Value dBµV/m	Limit dBµV/m	Limit exceeded
34.5	15.5	13.6	29.1	40.0	
35.5	17.5	13.4	30.9	40.0	
40.9	18.0	12.2	30.2	40.0	
42.0	17.5	12.0	29.5	40.0	
45.2	17.0	11.5	28.5	40.0	
71.4	11.5	10.2	21.7	40.0	
85.7	14.0	10.5	24.5	40.0	
90.3	16.0	10.8	26.8	43.5	
96.2	13.5	11.2	24.7	43.5	
102.5	19.5	11.7	31.2	43.5	
107.4	25.5	12.2	37.7	43.5	
110.0	17.5	12.4	29.9	43.5	
111.7	25.0	12.5	37.5	43.5	
116.0	26.5	12.9	39.4	43.5	
120.0	23.0	13.2	36.2	43.5	
120.2	25.0	13.2	38.2	43.5	
124.5	25.0	13.5	38.5	43.5	
130.0	20.5	13.8	34.3	43.5	
133.1	20.0	14.0	34.0	43.5	
137.4	23.5	14.2	37.7	43.5	
140.0	27.5	14.3	41.8	43.5	
141.7	20.5	14.4	34.9	43.5	
145.0	18.5	14.6	33.1	43.5	
146.0	22.0	14.7	36.7	43.5	
150.0	17.5	14.9	32.4	43.5	
150.3	19.5	14.9	34.4	43.5	
154.6	17.0	15.1	32.1	43.5	
167.5	17.5	15.8	33.3	43.5	
176.1	22.5	16.2	38.7	43.5	
180.0	17.0	16.3	33.3	43.5	
184.7	18.5	16.5	35.0	43.5	
205.0	18.0	17.3	35.3	43.5	
220.0	14.0	17.8	31.8	46.0	
230.0	16.5	18.1	34.6	46.0	
240.0	14.0	18.4	32.4	46.0	
320.0	14.5	17.6	32.1	46.0	
455.2	9.0	21.8	30.8	46.0	

Result: Limit kept

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**Radiated Emission Test 30 MHz - 1 GHz
according to FCC Part 15 Subpart C**

Model: NBase 3.2	Mode: - reading tag continuously (distance 10 cm) - with supply voltage 24 V DC - with micro antenna
Serial no.: Prototype 1	
Applicant: Hermos Informatik GmbH	
Test site: Open area test-site I	
Tested on: Test distance 3 meters Horizontal Polarization	
Date of test: 07/30/1998	
Test performed: by hand	File name:

Detector: Quasi-Peak	List of values: Selected by hand
---------------------------------------	---

[illegible]

Result: Limit kept	Project file: 50831-80684	Page 53 of 55 Pages
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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:

NBase 3.2

Serial no.:

Prototype 1

Applicant:

Hermos Informatik GmbH

Test site:

Open area test-site I

Tested on:

Test distance 3 meters

Vertical Polarization

Date of test:

07/30/1998

Operator:

R. Heller

Test performed:

by hand

File name:

Mode:

- reading tag continuously (distance 10 cm)

- with supply voltage 24 V DC

- with micro antenna

Detector:

Quasi-Peak

List of values:

Selected by hand

dB μ V/m

Limit1: FCC Subpart C

Transducer: HK116 / HL223 (3 m)

70

65

60

55

50

45

40

35

30

25

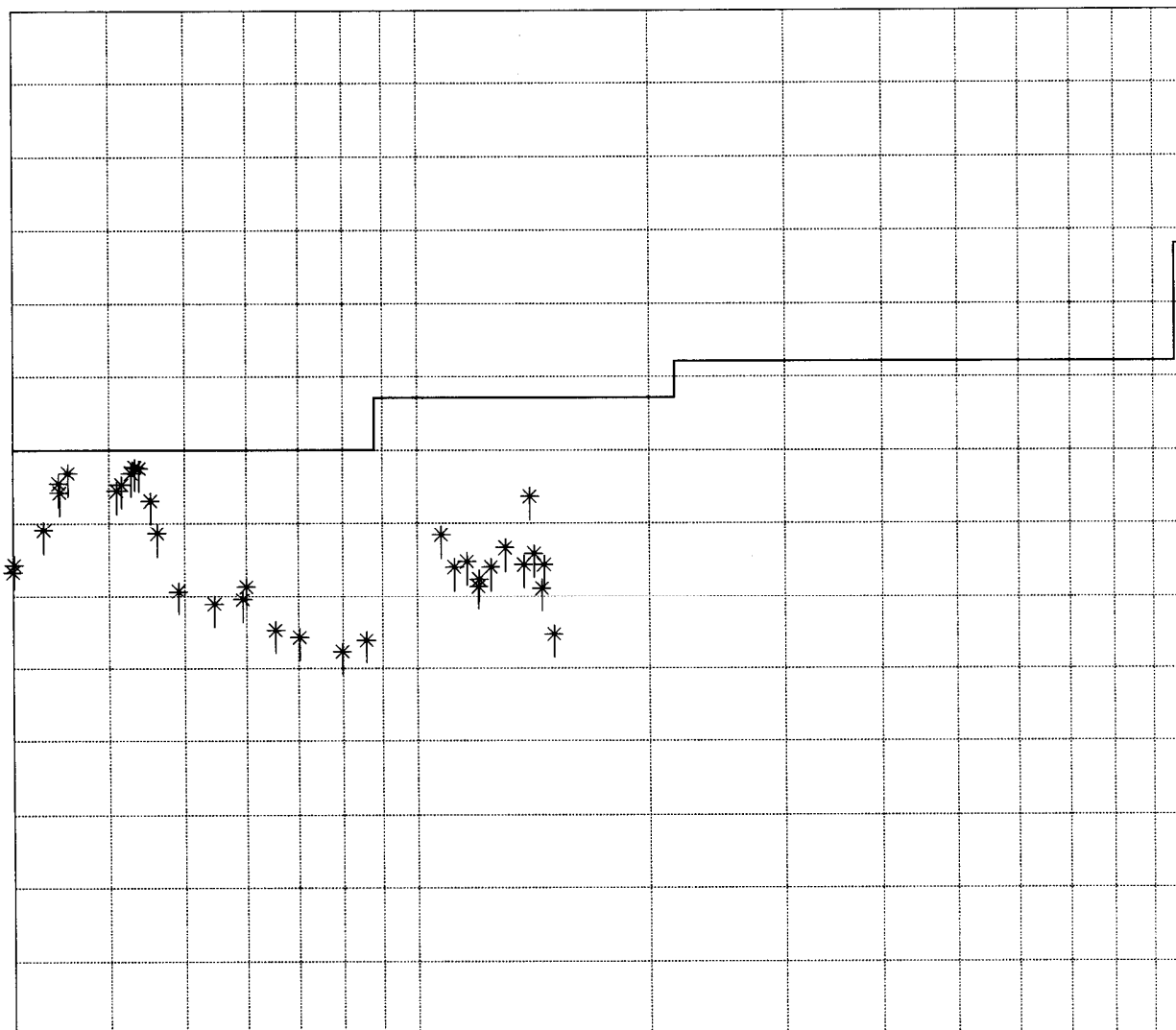
20

15

10

5

0



30

100

1000
MHz

Result:

Limit kept

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Radiated Emission Test 30 MHz - 1 GHz according to FCC Part 15 Subpart C

Model:

NBase 3.2

Serial no.:

Prototype 1

Applicant:

Hermos Informatik GmbH

Test site:

Open area test-site I

Tested on:

Test distance 3 meters

Vertical Polarization

Date of test:

07/30/1998

Operator:

R. Heller

Test performed:

by hand

File name:

Mode:

- reading tag continuously (distance 10 cm)

- with supply voltage 24 V DC

- with micro antenna

Detector:

Quasi-Peak

List of values:

Selected by hand

Frequency MHz	Reading dBµV	Correction factor dB	Value dBµV/m	Limit dBµV/m	Limit exceeded
30.0	17.0	14.7	31.7	40.0	
30.1	17.5	14.7	32.2	40.0	
32.9	20.5	14.0	34.5	40.0	
34.4	24.0	13.7	37.7	40.0	
34.5	23.5	13.6	37.1	40.0	
35.4	25.0	13.4	38.4	40.0	
40.9	25.0	12.2	37.2	40.0	
41.5	25.5	12.1	37.6	40.0	
42.7	26.5	11.9	38.4	40.0	
43.2	27.0	11.8	38.8	40.0	
43.7	27.0	11.7	38.7	40.0	
45.2	25.0	11.5	36.5	40.0	
46.1	23.0	11.3	34.3	40.0	
49.1	19.5	10.9	30.4	40.0	
54.6	19.0	10.5	29.5	40.0	
59.4	19.5	10.3	29.8	40.0	
60.0	20.5	10.2	30.7	40.0	
65.5	17.5	10.2	27.7	40.0	
70.3	17.0	10.2	27.2	40.0	
79.8	16.0	10.2	26.2	40.0	
85.8	16.5	10.5	27.0	40.0	
107.4	22.0	12.2	34.2	43.5	
111.7	19.5	12.5	32.0	43.5	
116.0	19.5	12.9	32.4	43.5	
120.0	17.5	13.2	30.7	43.5	
120.2	18.0	13.2	31.2	43.5	
124.5	18.5	13.5	32.0	43.5	
130.0	19.5	13.8	33.3	43.5	
137.4	18.0	14.2	32.2	43.5	
140.0	22.5	14.3	36.8	43.5	
141.7	18.5	14.4	32.9	43.5	
145.0	16.0	14.6	30.6	43.5	
146.0	17.5	14.7	32.2	43.5	
150.3	12.5	14.9	27.4	43.5	

Result:

Limit kept

Project file:

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