SENTON

■ EMV-Prüfzentrum ■ EMI/EMC-Testcenter ■

Straubing, March 2, 2001

T E S T - R E P O R T

No. 50209-10097-1

for

HFS 3000

Transmitter for RF-tapping control system

Applicant:	Otto Bilz Werkzeugfabrik GmbH & Co.
Purpose of testing:	To show compliance with FCC Code of Federal Regulations, Part 15 Subpart C, Sections §15.205 and §15.209

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):	HFS 3000
Serial number(s):	04/01
Type of equipment:	Transmitter for RF-tapping control system
Parts/accessories:	---
Version of EUT:	as delivered
FCC-ID:	OCLHFS3000-49

Applicant:	Otto Bilz Werkzeugfabrik GmbH & Co.
(full address)	Vogelsangstrasse 8 D-73760 Ostfildern Germany
Contract identification:	---
Contact person:	Mr. Harald Esslinger
Manufacturer:	Otto Bilz Werkzeugfabrik GmbH & Co.

Receipt of EUT:	February 28, 2001
Date of test:	February 28, 2001
Note:	---

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

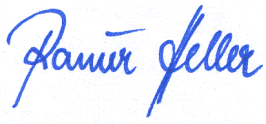
2. Identification of Test Laboratory

Test Laboratory: (full address):	Senton GmbH EMI/EMC Test Center Aeussere Fruehlingstrasse 45 D-94315 Straubing Germany	
Contact person:	Mr. Johann Roidt	
Communication:	Telephone Fax eMail:	(+49) 0 94 21 / 55 22-0 (+49) 0 94 21 / 55 22-99 Office@senton.de
FCC registration number:	90926	
Industry Canada file number:	IC 3050	

3. Summary of Test Results

The tested sample (including accessories) complies with the requirements set forth in the Code of Regulations Part 15 Subpart C (intentional radiators), Sections §15.205 and §15.209 of the Federal Communication Commission (FCC).

Johann Roidt
Technical Manager



Rainer Heller
Test Engineer

4. Operation Mode of EUT

All tests were performed with EUT transmitting continuously on channel 1U equivalent to a carrier frequency of 49.8316 MHz.
EUT was supplied by fully charged batteries and set up in vertical position

5. Configuration of EUT and Peripheral Devices

RF-transmitter HFS 3000 was tested as stand-alone device.

Configuration of cables of host

Not applicable

Configuration of host and peripheral devices

Not applicable

6. Measuring Methods

6.1. Radiated Emission 30 MHz - 1 GHz (§15.205, §15.209)

Radiated emissions were measured over the frequency range from 30 MHz to 1 GHz. The bandwidth of the EMI-receiver was set to 120 kHz and the detector-function was set to CISPR quasi-peak.
The test setup was made in accordance with ANSI C63.4-1992. Measurements were made in both the horizontal and vertical planes of polarization. Preliminary scans were taken in a semi-anechoic room using a spectrum analyzer with the detector function set to peak. All tests were performed at a test-distance of 3 meters. For final testing an open-area test-site was used. During the tests the EUT was rotated all around and the receiving-antenna was raised and lowered from 1 meter to 4 meters to find the maximum levels of emissions. The cables and equipment were placed and moved within the range of position likely to find their maximum emissions.
See figure 1 for the measurement setup.

Test equipment used (see equipment list for details):
01, 06, 12, 38, 39, 40, 41, 58, 61, 64, 66

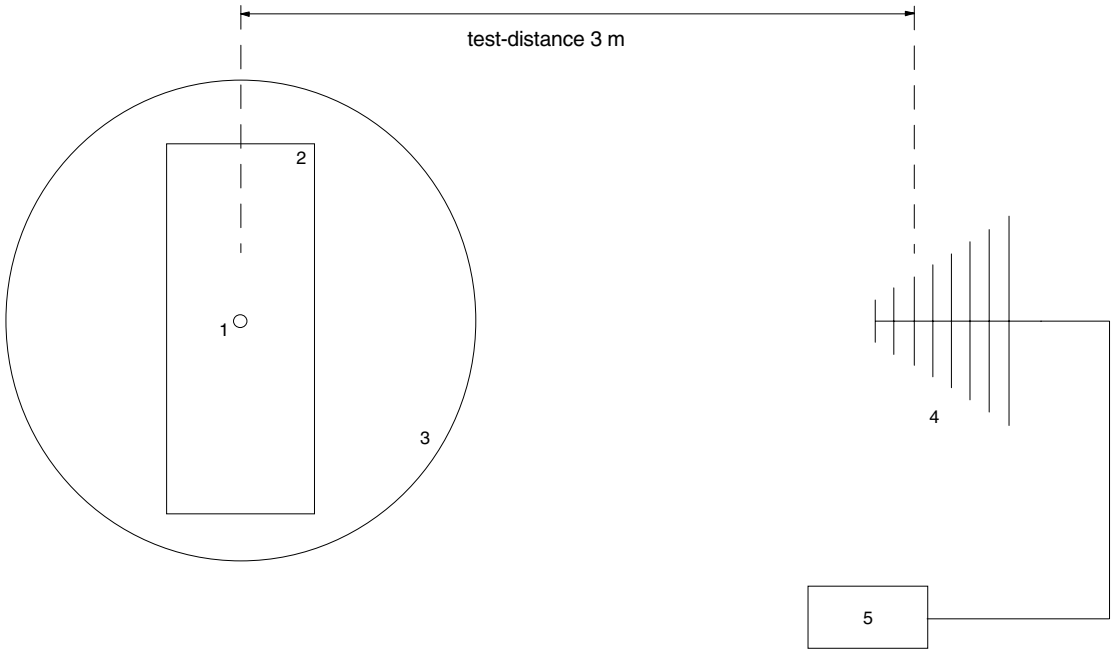


Figure 1: Measurement setup for radiated emission test

1 EUT
2 Wooden table
3 Measurement antenna
4 Test receiver
5 Turn table

7. 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	862770/021	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	Cable for Antenna Connector			Lucent Technologies
68	DC Block 0.01-18GHz		8037	Inmet Corp.
69	High pass filter			Lucent Technologies

8. List of Measurements

FCC Part 15 Subpart C			
Section(s):	**Test**	**Page**	**Result**
§15.207	Conducted emission test 450 kHz - 30 MHz	---	Not applicable[1]
§15.205 **§15.209**	Radiated emission test 30 MHz - 1 GHz	18 - 22	Test passed

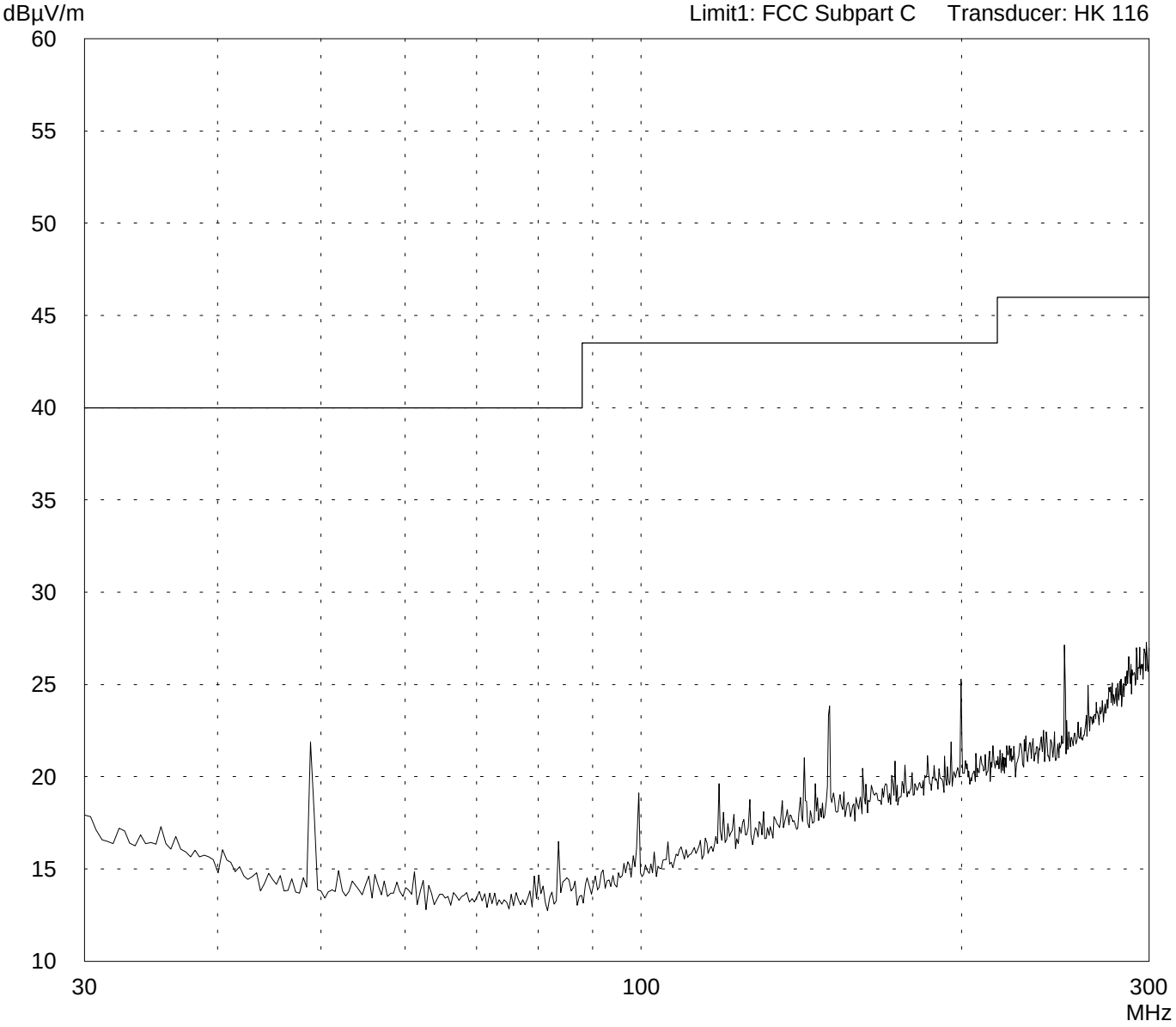
[1] EUT is supplied by battery.

9. Test Results

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

Model: HFS 3000	Mode:
Serial no.: 04/01	- FCC test setup according to ANSI C63.4 (stand alone)
Applicant: Otto Bilz Werkzeugfabrik GmbH & Co.	- with battery supply
Test site: Semi anechoic room, cabin no. 3	- EUT in vertical position
Tested on: Test distance 3 meters Horizontal Polarization	- transmitting continuously on channel 1U
Date of test: 02/28/2001 / Operator: R. Heller	
Test performed: automatically / File name:	

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



Result: Prescan	Project file: 50209-10097-1

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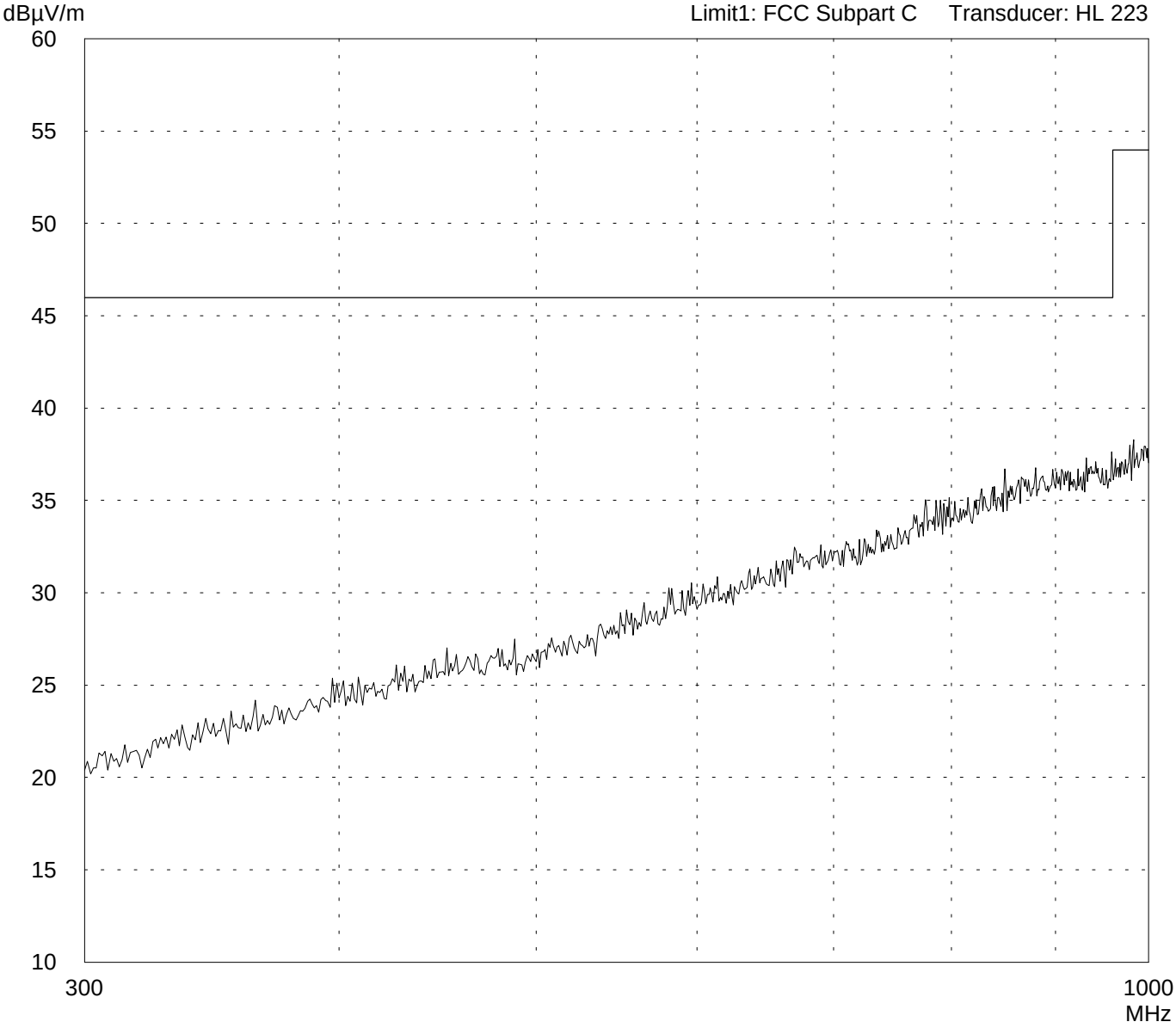
Radiated Emission Test 300 MHz - 1 GHz
according to FCC Part 15 Subpart C

Model: HFS 3000	Mode:
Serial no.: 04/01	- FCC test setup according to ANSI C63.4 (stand alone)
Applicant: Otto Bilz Werkzeugfabrik GmbH & Co.	- with battery supply
Test site: Semi anechoic room, cabin no. 3	- EUT in vertical position
Tested on: Test distance 3 meters Horizontal Polarization	- transmitting continuously on channel 1U
Date of test: 02/28/2001 / Operator: R. Heller	
Test performed: automatically / File name:	
Detector: Peak	List of values: Selected by hand



Result: Prescan	Project file: 50209-10097-1

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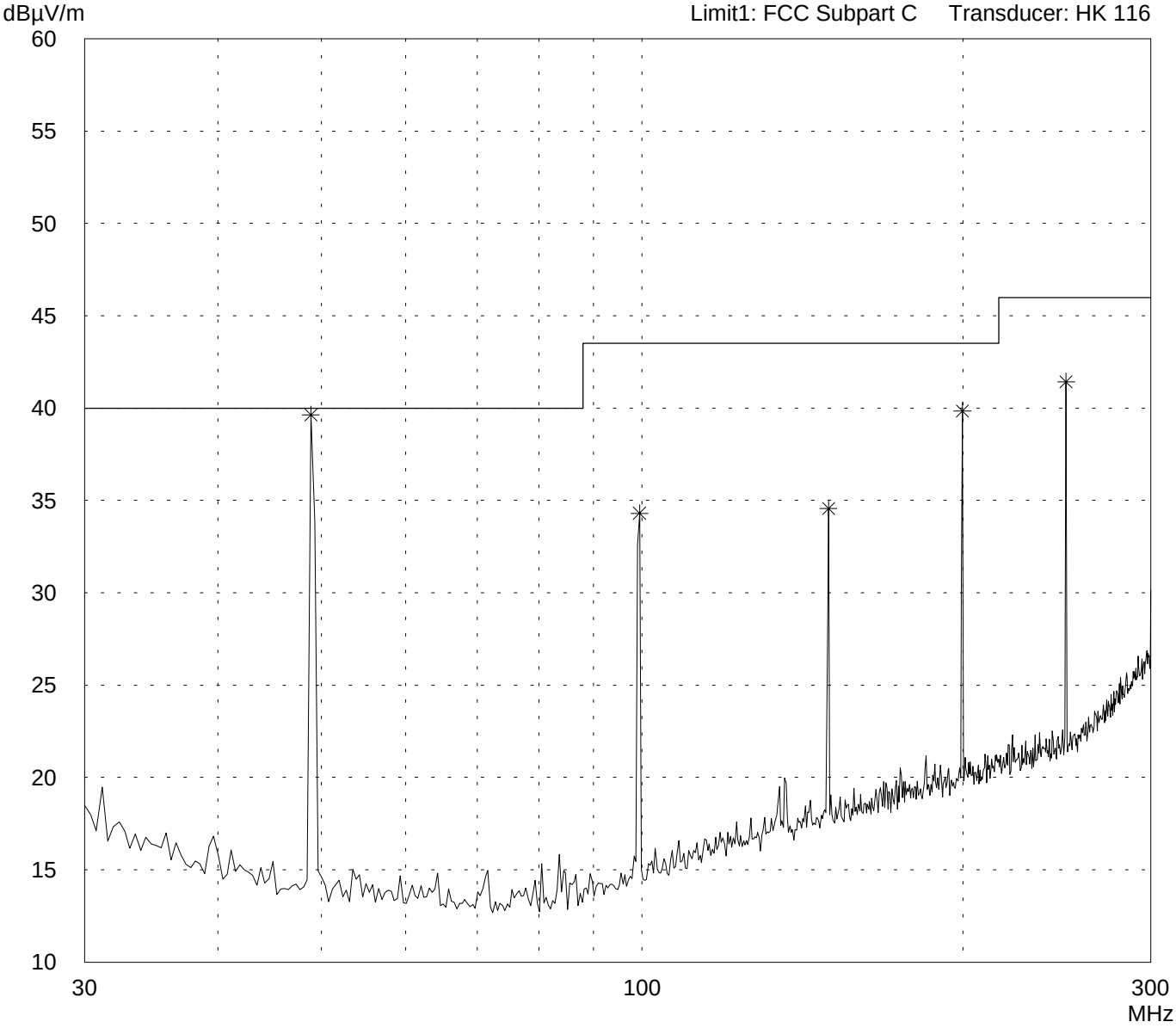
Radiated Emission Test 30 MHz - 300 MHz
according to FCC Part 15 Subpart C

Model: HFS 3000	Mode:
Serial no.: 04/01	- FCC test setup according to ANSI C63.4 (stand alone)
Applicant: Otto Bilz Werkzeugfabrik GmbH & Co.	- with battery supply
Test site: Semi anechoic room, cabin no. 3	- EUT in vertical position
Tested on: Test distance 3 meters Vertical Polarization	- transmitting continuously on channel 1U
Date of test: 02/28/2001 / Operator: R. Heller	
Test performed: automatically / File name:	

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



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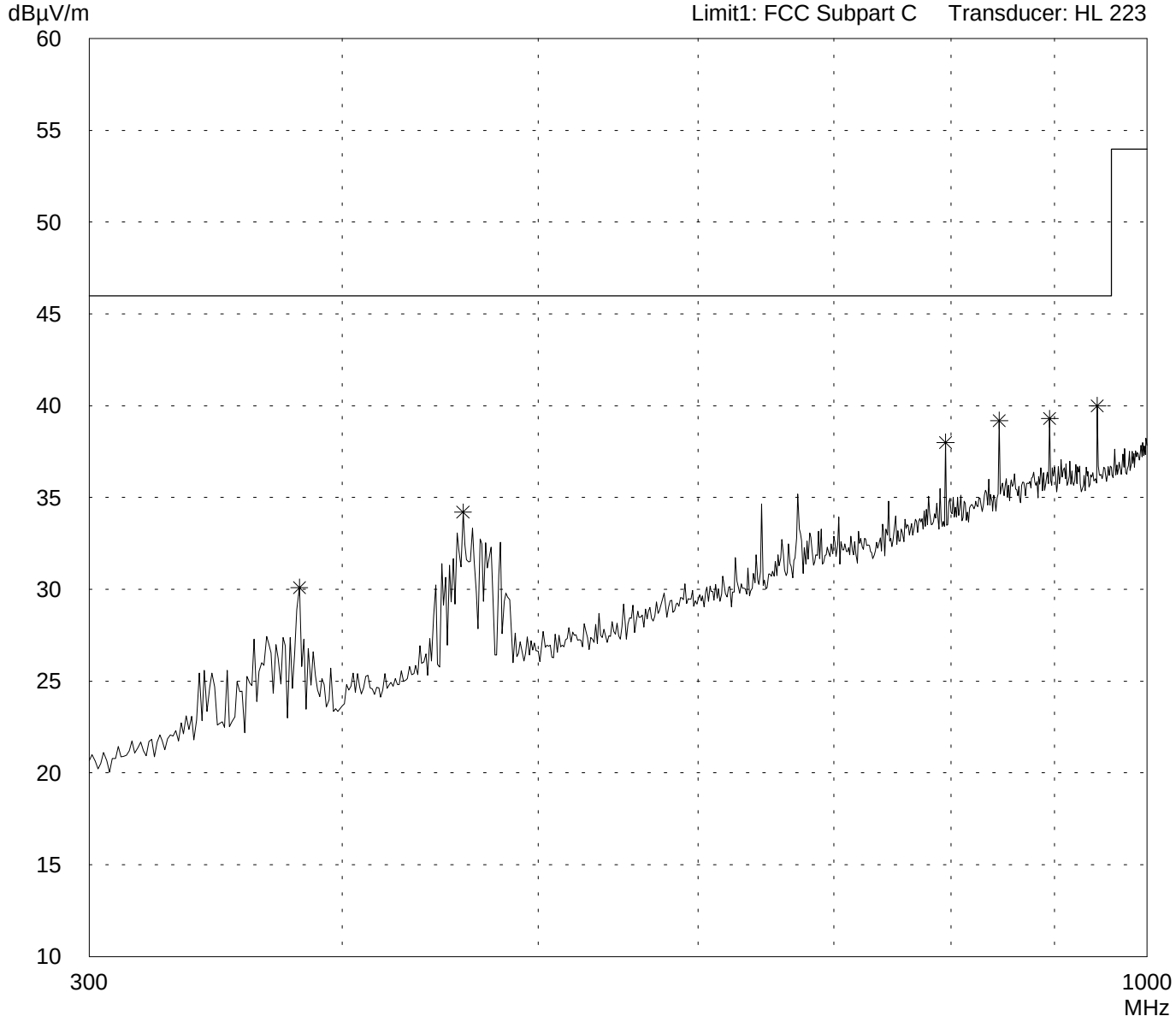
Radiated Emission Test 300 MHz - 1 GHz
according to FCC Part 15 Subpart C

Model: HFS 3000	Mode:
Serial no.: 04/01	- FCC test setup according to ANSI C63.4 (stand alone)
Applicant: Otto Bilz Werkzeugfabrik GmbH & Co.	- with battery supply
Test site: Semi anechoic room, cabin no. 3	- EUT in vertical position
Tested on: Test distance 3 meters Vertical Polarization	- transmitting continuously on channel 1U
Date of test: 02/28/2001 / Operator: R. Heller	
Test performed: automatically / File name:	
Detector: Peak	List of values: Selected by hand



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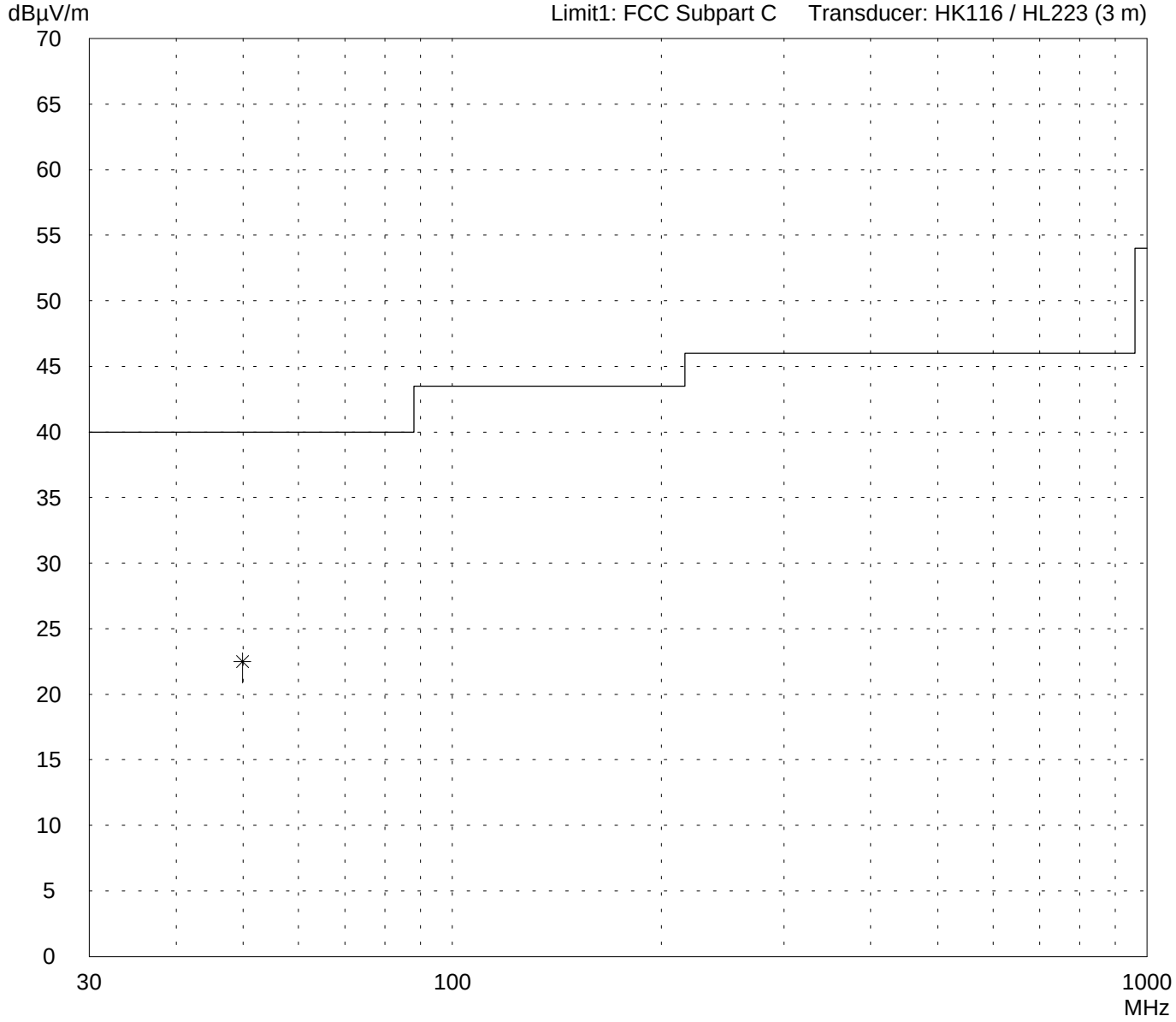
Radiated Emission Test 30 MHz - 1 GHz
according to FCC Part 15 Subpart C

Model: HFS 3000	Mode:
Serial no.: 04/01	- FCC test setup according to ANSI C63.4 (stand alone)
Applicant: Otto Bilz Werkzeugfabrik GmbH & Co.	- with battery supply
Test site: Open area test-site I	- EUT in vertical position
Tested on: Test distance 3 meters Horizontal Polarization	- transmitting continuously on channel 1U
Date of test: 02/28/2001 / Operator: R. Heller	
Test performed: by hand / File name:	

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



Result: Limit kept	Project file: 50209-10097-1

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

Model: HFS 3000	Mode: - FCC test setup according to ANSI C63.4 (stand alone) - with battery supply - EUT in vertical position - transmitting continuously on channel 1U
Serial no.: 04/01	
Applicant: Otto Bilz Werkzeugfabrik GmbH & Co.	
Test site: Open area test-site I	
Tested on: Test distance 3 meters Horizontal Polarization	
Date of test: 02/28/2001 / Operator: R. Heller	
Test performed: by hand / File name:	

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

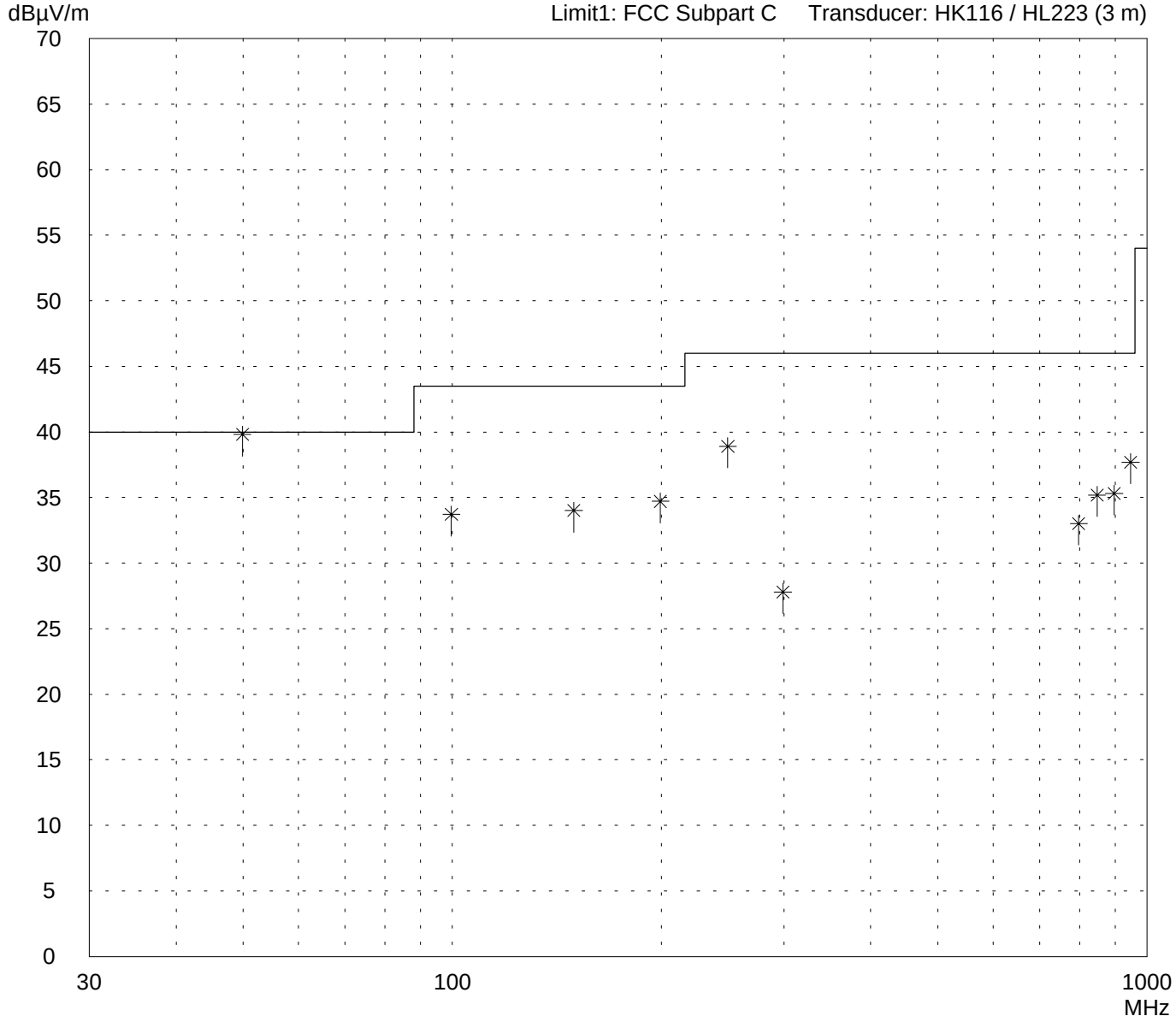
Frequency MHz	*Reading dBµV*	*Correction factor dB*	*Value dBµV/m*	*Limit dBµV/m*	*Limit exceeded*
49.832	10.9	11.6	22.5	40.0	

Result: Limit kept	Project file: 50209-10097-1

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

Model: HFS 3000	Mode:
Serial no.: 04/01	- FCC test setup according to ANSI C63.4 (stand alone)
Applicant: Otto Bilz Werkzeugfabrik GmbH & Co.	- with battery supply
Test site: Open area test-site I	- EUT in vertical position
Tested on: Test distance 3 meters Vertical Polarization	- transmitting continuously on channel 1U
Date of test: 02/28/2001 / Operator: R. Heller	
Test performed: by hand / File name:	

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



Result: Limit kept	Project file: 50209-10097-1

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

Model:
HFS 3000

Serial no.:
04/01

Applicant:
Otto Bilz Werkzeugfabrik GmbH & Co.

Test site:
Open area test-site I

Tested on:
Test distance 3 meters
Vertical Polarization

Date of test: 02/28/2001

Operator: R. Heller

Test performed: by hand

File name:

Mode:
- FCC test setup according to ANSI C63.4 (stand alone)
- with battery supply
- EUT in vertical position

- transmitting continuously on channel 1U

Detector: Quasi-Peak

List of values: Selected by hand

Frequency MHz	*Reading dBµV*	*Correction factor dB*	*Value dBµV/m*	*Limit dBµV/m*	*Limit exceeded*
49.832	28.2	11.6	39.8	40.0	
99.663	21.5	12.2	33.7	43.5	
149.495	17.7	16.3	34.0	43.5	
199.326	15.7	19.0	34.7	43.5	
249.158	18.4	20.5	38.9	46.0	
298.990	2.6	25.2	27.8	46.0	
797.304	1.0	32.0	33.0	46.0	
847.134	2.3	32.9	35.2	46.0	
896.965	1.5	33.8	35.3	46.0	
946.798	3.2	34.5	37.7	46.0	

Result: Limit kept

Project file: 50209-10097-1

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