

# CETECOM ICT Services GmbH

Radio Satellite Communication

Untertürkheimer Straße 6-10 . D-66117 Saarbrücken

Telefon: +49 (0)681 598-9100

Telefax: -9075

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RSC11

issue test report consist of

24 Pages

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## **Akkreditiertes Prüflaboratorium**

**DAR-Registriernummer:**

**TTI-P-G 166/98**

**Test report no.: 2\_2356-B/00**

**FCC Rule 15.225**

**ID ISC.LRM200**

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### **1 General information**

#### **1.1 Notes**

The test results of this test report relate exclusively to the test item specified in 1.5. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

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## 1.2 Testing laboratory

CETECOM ICT Services GmbH

66117 Saarbrücken

Untertürkheimer Straße 6 - 10

Deutschland

Telephone: + 49 681 598 - 8411

Telefax : + 49 681 598 - 9075

E-mail : Michael.Berg@ict.cetecom.de

Internet : www.cetecom.de

**Accredited testing laboratory**

**DAR-registration number : TTI-P-G-166/98**

## 1.3 Details of applicant

**Name** : FEIG ELECTRONIC GmbH

**Street** : Lange Straße 4

**City** : D-35781 Weilburg-Waldhausen

**Country** : Germany

**Telephone** : +49 (0)6471 / 3109-0

**Telefax** : +49 (0)6471 / 3109-99

**Contact** : Mr. Elmar Reichwein

**Telephone:** +49 (0)6471 / 3109-38

## 1.4 Application details

Date of receipt of application : 08.12.00

Date of receipt of test item : 12.12.00

Date of test : 12.12.00

## 1.5 Test item

Type of equipment : **Transponder system**

Type designation : **ID ISC.LRM200**

Manufacturer :

Street :

City :

Country :

Serial number :

**Additional informations:** :

Frequency : **13,56 MHz / 00H0NON**

Number of channels : **1**

Antenna : **Inductive loop antenna**

Power supply : **24V DC / 1,4 A ext.**

Type of equipment :

Carrier power : **0,62 mW ERP / 0,90 mW EIRP**

## 1.6 Test standards: FCC Rule Part 15.225

# CETECOM ICT Services GmbH

## 2      Technical test

### 2.1      Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

Technical responsibility for area of testing :

<b>23.12.99</b>	<b>RSC8411</b>	<b>Berg M.</b>	
<b>Date</b>	<b>Section</b>	<b>Name</b>	<b>Signature</b>

<b>23.12.99</b>	<b>RSC8414</b>	<b>Ames H.</b>	
<b>Date</b>	<b>Section</b>	<b>Name</b>	<b>Signature</b>

## 2.2 Test report

**TEST REPORT**

**FCC Rule Part 15.225**

**Test report no. : 2\_2356-B/00**

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## TEST REPORT REFERENCE

## LIST OF MEASUREMENTS

<b>SUBCLAUSE</b>	<b>PARAMETER TO BE MEASURED</b>	<b>PAGE</b>
	<b>Transmitter parameters</b>	
§ 15.225 (a)	Field strength of fundamental	7
§ 15.209	Emissions radiated outside of the specified frequency bands	8
	<b>Band edge compliance</b>	
§ 15.225 (c)	Frequency tolerance	11
§ 15.207	Conducted limits	13
	<b>Test equipment listing</b>	<b>14</b>
	<b>Photographs of the equipment</b>	<b>16</b>

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Equipment under test : ID ISC.LRM200

Ambient temperature : 23°C

Relative humidity : 37%

## FIELD STRENGTH OF FUNDAMENTIAL

SUBCLAUSE § 15.225 (a)

Polarisation of the measurements for the larger power level .: vertical

Measurement distance 30 m

TEST CONDITIONS		FIELD STRENGTH ( $\mu\text{V/m}$ )		
Frequency (MHz)		13,56		
$T_{\text{nom}}$ ( 23 )°C	$V_{\text{nom}}$ ( 24.0 )V	QP: 5902 $\mu\text{V/m}$ 75.42 dB $\mu\text{V/m}$		
Maximum deviation from output power under extreme test conditions (dBc)		-0,18		
Measurement uncertainty		±3dB		

## Limits

SUBCLAUSE § 15.225 (a)

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	Measurement distance (m)
13,56	10,000 80 dB $\mu\text{V/m}$	30

## REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

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Equipment under test : ID ISC.LRM200

Ambient temperature : 23°C

Relative humidity : 37%

## EMISSIONS RADIATED

SUBCLAUSE §15.209

Transmitter operating

Modulated/~~Unmodulated~~\*

\*(Delete whichever is inappropriate)

Measurement distance see table

SPURIOUS EMISSIONS LEVEL (µV/m)								
13,56 MHz								
f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)	f (MHz)	Detector	Level (µV/m)
33,9	QP	79,43	250,28	QP	41,21			
54,46	QP	37,58	950,2	QP	94,41			
95,08	QP	41,21						
108,5	QP	78,52						
122,0	QP	75,86						
129,37	QP	48,42						
149,08	QP	34,67						
176,89	QP	33,50						
190,35	QP	43,65						
196,97	QP	36,73						
Measurement uncertainty			± 3dB					

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

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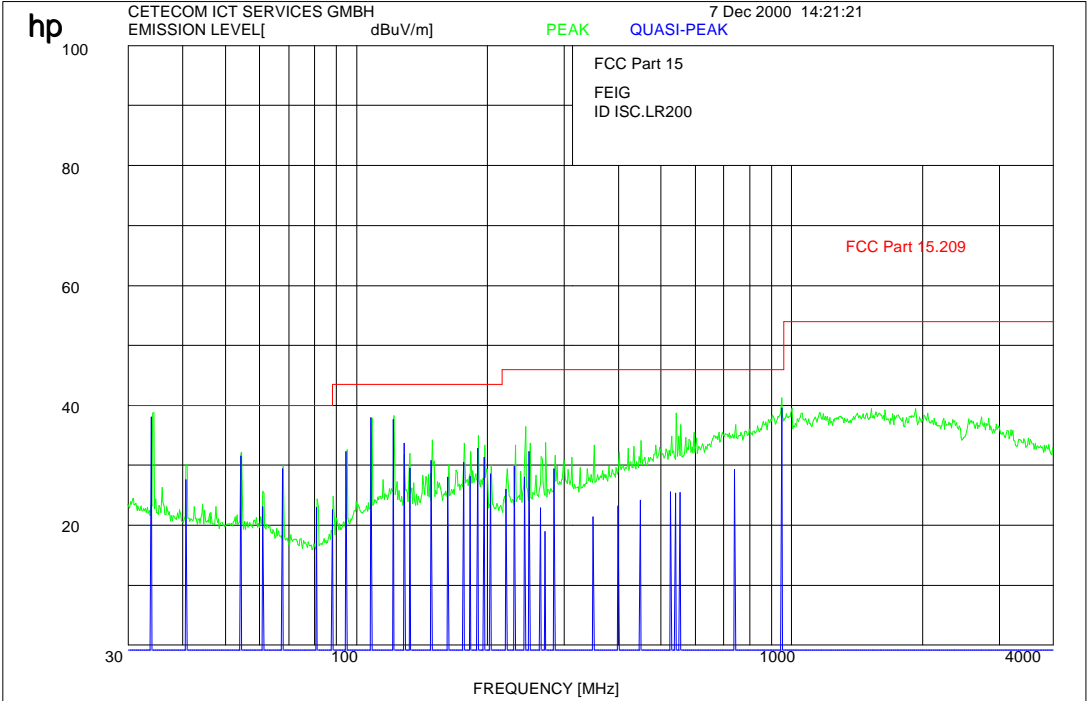
Issue Date: 14.12.2000

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**Equipment under test : ID ISC.LRM200**  
**Ambient temperature : 23°C**  
**Relative humidity : 37%**

## EMISSIONS RADIATED

## SUBCLAUSE §15.209



**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
**(for reference numbers see test equipment listing)**  
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Equipment under test : ID ISC.LRM200

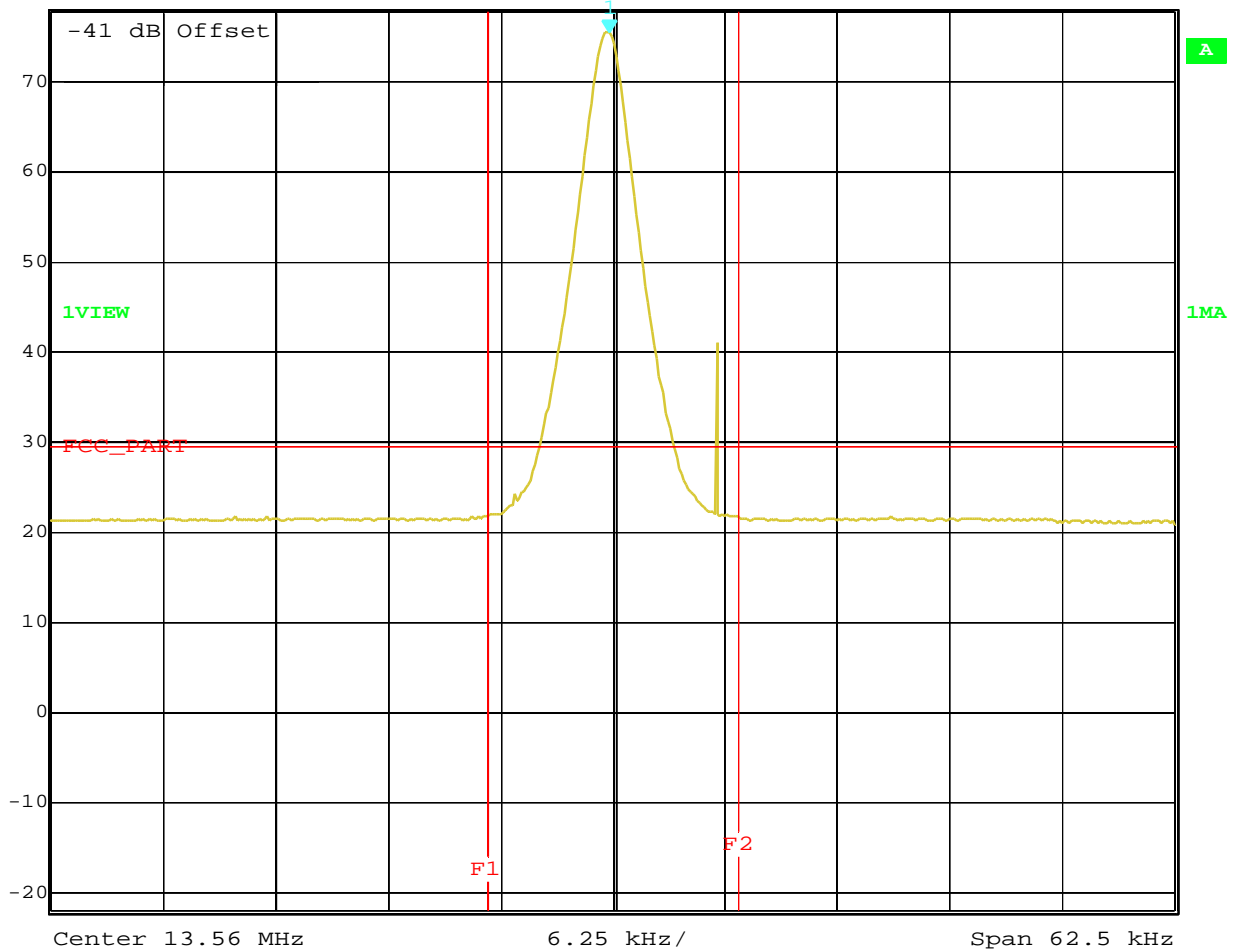
Ambient temperature : 23°C

Relative humidity : 37%

## Band-edge compliance

## SUBCLAUSE §15.209

	Marker 1 [T1]	RBW	1 kHz	RF Att	30 dB
	Ref Lvl	75.43 dBµV	VBW	3 kHz	
	78 dBµV	13.55981212 MHz	SWT	20 s	Unit



Date: 7.DEC.2000 14:51:13

**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**  
(for reference numbers see test equipment listing)

**Equipment under test : ID ISC.LRM200**

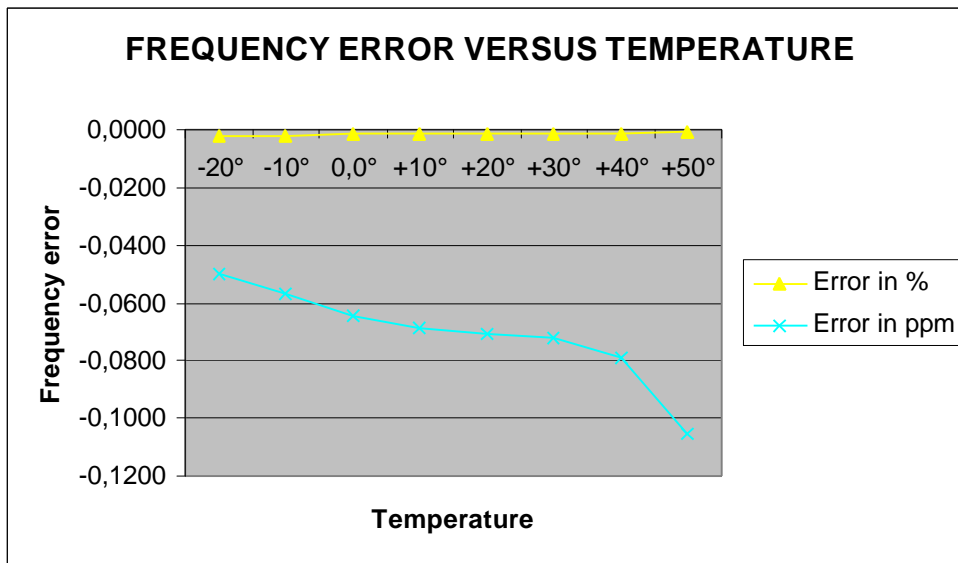
**Ambient temperature : 23°C**

**Relative humidity : 37%**

**FREQUENCY STABILITY**

**SUBCLAUSE §15.225 (c)**

Temperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-20°	-273	13,56	-0,0020	-0,0497
-10°	-237	13,56	-0,0017	-0,0572
0,0°	-211	13,56	-0,0016	-0,0643
+10°	-198	13,56	-0,0015	-0,0685
+20°	-192	13,56	-0,0014	-0,0706
+30°	-188	13,56	-0,0014	-0,0721
+40°	-172	13,56	-0,0013	-0,0788
+50°	-129	13,56	-0,0010	-0,1051



**Limit**

**SUBCLAUSE §15.225 (c)**

Conditions: -20°C to +50°C at normal supply voltage and variation from 85% to 115% of the rated supply voltage at 20°C	± 0,01 %
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**REFERENCE NUMBER(S) OF TEST EQUIPMENT USED**

(for reference numbers see test equipment listing)

01 , 02 , 05

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**Equipment under test : ID ISC.LRM200**

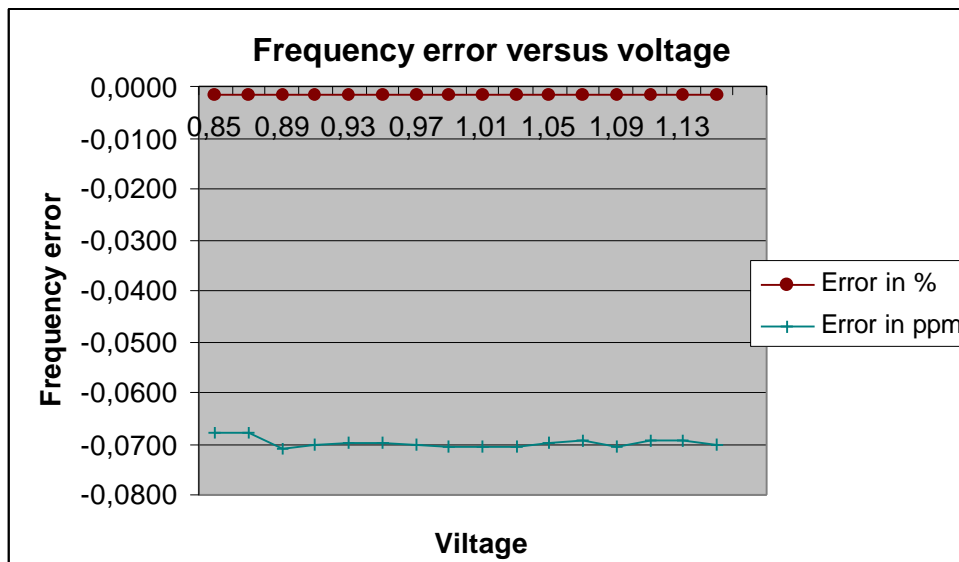
**Ambient temperature : 23°C**

**Relative humidity : 37%**

## FREQUENCY STABILITY

## SUBCLAUSE §15.225 (c)

nom. Voltage	nom. Voltage in %	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
24	0,85	20,40	-200	13,56	-0,0015	-0,0678
	0,87	20,88	-200	13,56	-0,0015	-0,0678
	0,89	21,36	-191	13,56	-0,0014	-0,0710
	0,91	21,84	-193	13,56	-0,0014	-0,0703
	0,93	22,32	-194	13,56	-0,0014	-0,0699
	0,95	22,80	-194	13,56	-0,0014	-0,0699
	0,97	23,28	-193	13,56	-0,0014	-0,0703
	0,99	23,76	-192	13,56	-0,0014	-0,0706
	1,01	24,24	-192	13,56	-0,0014	-0,0706
	1,03	24,72	-194	13,56	-0,0014	-0,0706
	1,05	25,20	-194	13,56	-0,0014	-0,0699
	1,07	25,68	-195	13,56	-0,0014	-0,0695
	1,09	26,16	-192	13,56	-0,0014	-0,0706
	1,11	26,64	-195	13,56	-0,0014	-0,0695
	1,13	27,12	-195	13,56	-0,0014	-0,0695
	1,15	27,60	-193	13,56	-0,0014	-0,0703



### Limit

### SUBCLAUSE §15.225 (c)

Conditions: -20°C to +50°C at normal supply voltage and variation from 85% to 115% of the rated supply voltage at 20°C	± 0,01 %
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### REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

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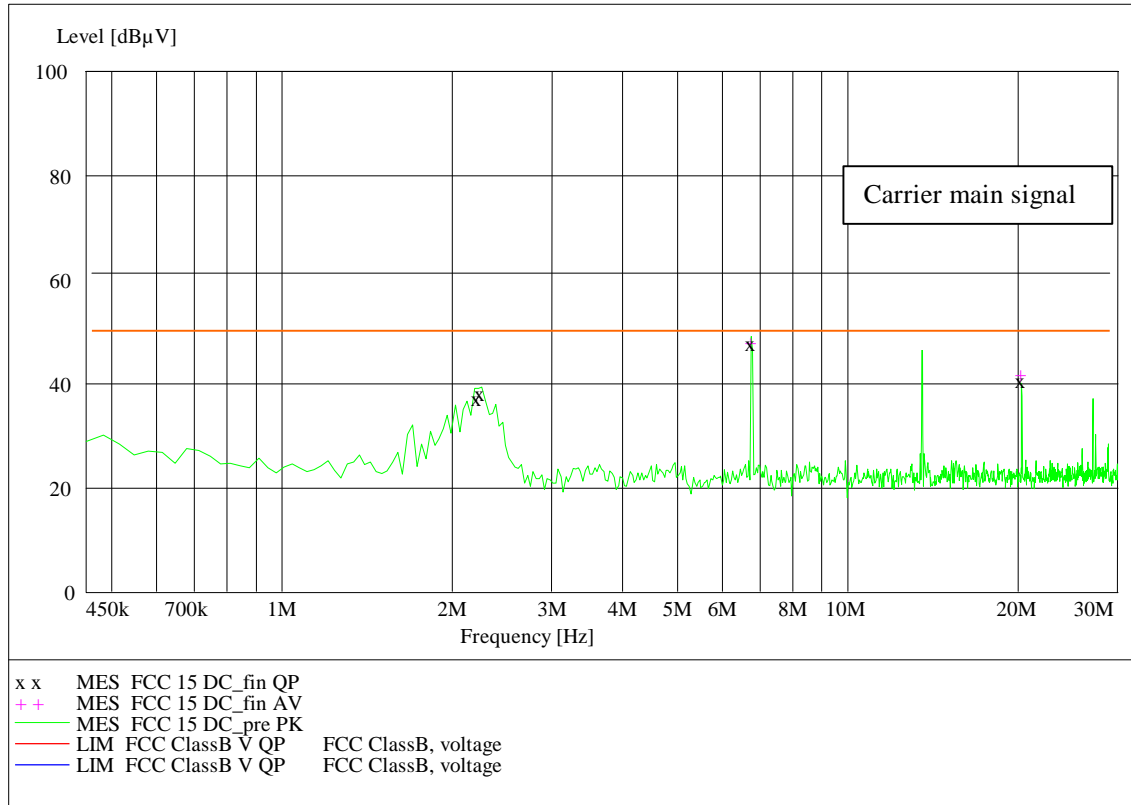
**Equipment under test : ID ISC.LRM200**

**Ambient temperature : 23°C**

**Relative humidity : 37%**

## CONDUCTED EMISSIONS

## SUBCLAUSE § 15.207 / 15.107



Frequency (MHz)	Level (dBµV) (QP)	Limit (dBµV)	Line
2.226	37.30	48.0	MINUS
2.250	38.30	48.0	MINUS
6.780	47.80	48.0	MINUS
13.560 (Carrier) !	46.10	48.0	PLUS
20.340	40.80	48.0	MINUS

**Limit**

**Technical specification : 15.207 / 15.107**

0.45 to 30 MHz	250 µV / 47.96 dBµV
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## TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	8566 A	Hewlett-Packard	1925A00257
02	Analyzer Display	8566 A	Hewlett-Packard	1925A00860
03	Oscilloscope	7633	Tektronix	230054
04	Radio Analyzer	CMTA 54	Rohde & Schwarz	894 043/010
05	System Power Supply	6038 A	Hewlett-Packard	2848A07027
06	Signal Generator	8111 A	Hewlett-Packard	2215G00867
07	Signal Generator	8662 A	Hewlett-Packard	2224A01012
08	Funktionsgenerator	AFGU	Rohde & Schwarz	862 480/032
09	Regeltrenntrafo	MPL	Erfi	91350
10	Netznachbildung	NNLA 8120	Schwarzbeck	8120331
11	Relais-Matrix	PSU	Rohde & Schwarz	893 285/020
12	Power-Meter	436 A	Hewlett-Packard	2101A12378
13	Power-Sensor	8484 A	Hewlett-Packard	2237A10156
14	Power-Sensor	8482 A	Hewlett-Packard	2237A00616
15	Modulationsmeter	9008	Racal-Dana	2647
16	Frequenzzähler	5340 A	Hewlett-Packard	1532A03899
17	Absorber Schirmkabine	---	MWB	87400/002
18	Spectrum Analyzer	85660 B	Hewlett-Packard	2747A05306
19	Analyzer Display	85662 A	Hewlett-Packard	2816A16541
20	Quasi Peak Adapter	85650 A	Hewlett-Packard	2811A01131
21	RF-Preselector	85685 A	Hewlett-Packard	2833A00768
22	Biconical Antenne	3104	Emco	3758
23	Log. Per. Antenne	3146	Emco	2130
24	Double Ridge Horn	3115	Emco	3088
25	EMI-Testreceiver	ESAI	Rohde & Schwarz	863 180/013
26	EMI-Analyzer-Display	ESAI-D	Rohde & Schwarz	862 771/008
27	Biconical Antenne	HK 116	Rohde & Schwarz	888 945/013
28	Log. Per. Antenne	HL 223	Rohde & Schwarz	825 584/002
29	Relais-Switch-Unit	RSU	Rohde & Schwarz	375 339/002
30	Highpass	HM985955	FSY Microwave	001
31	Amplifier	P42-GA29	Tron-Tech	B 23602
32	Absorber Schirmkabine		Frankonia	
33	Steuerrechner	PSM 7	Rohde & Schwarz	834 621/004
34	EMI Test Receiver	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

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No	Instrument/Ancillary	Type	Manufacturer	Serial No.
36	Controler	HD 100	Deisel	100/322/93
37	Relais Matrix	PSN	Rohde & Schwarz	829 065/003
38	Control Unit	GB 016 A2	Rohde & Schwarz	344 122/008
39	Relais Switch Unit	RSU	Rohde & Schwarz	316 790/001
40	Power Supply	6032A	Hewlett Packard	2846A04063
41	Spektrum Monitor	EZM	Rohde & Schwarz	883 720/006
42	Meßempfänger	ESH 3	Rohde & Schwarz	890 174/002
43	Meßempfänger	ESVP	Rohde & Schwarz	891 752/005
44	Biconi Ant. 20-300MHz	HK 116	Rohde & Schwarz	833 162/011
45	Logper Ant. 0.3-1 GHz	HL 223	Rohde & Schwarz	832 914/010
46	Amplifier 0.1-4 GHz	AFS4	Miteq Inc.	206461
47	Logper Ant. 1-18 GHz	HL 024 A2	Rohde & Schwarz	342 662/002
48	Polarisationsnetzwerk	HL 024 Z1	Rohde & Schwarz	341 570/002
49	Double Ridge G Horn Antenne 1-26.5 GHz	3115	EMCO	9107-3696
50	Microw. Sys. Amplifier 0.5- 26.5 GHz	8317A	Hewlett Packard	3123A00105
51	Steuerrechner	PSA 17	Rohde & Schwarz	883086/026
52	Analyzer	EZM	Rohde & Schwarz	883086/026
53	Receiver	ESH3	Rohde & Schwarz	881515/002
54	Relais Matrix	PSU	Rohde & Schwarz	882943/029
55	Art.mains network	ESH2Z5	Rohde & Schwarz	882394/007
56	Art.mains network	ESH3Z5	Rohde & Schwarz	861189/014
57	Art.mains network	ESH3Z5	Rohde & Schwarz	892475/017
58	Art.mains network	ESH3Z5	Rohde & Schwarz	894981/019
59	Art.mains network	ESH3Z6	Rohde & Schwarz	836501/652
60	Art.mains network	ESH3Z6	Rohde & Schwarz	861406/005
61	Art.mains network	ESH3Z6	Rohde & Schwarz	893689/012
62	Art.mains network	HFH2Z2	Rohde & Schwarz	881058/42
63	Power supply	6032A	Hewlett Packard	2818A-03449
64	Spectrum Analyzer	FSIQ 26	Rohde & Schwarz	119.6001.27
65	Magn. Ant. 9 kHz–30 Mhz			
66				
67				
68				
69				