



TTI-P-G166/98-30

Accredited Bluetooth™ Test Facility (BQTF)

Test report no.: 2_2830-01-01/02

FCC Part 15.231

RCS5200

FCC-ID:PT5RC5200

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Table of Contents

1 General information

1.1 Notes

1.2 Testing laboratory

1.3 Details of applicant

1.4 Application details

1.5 Test item

1.6 Test standards

2 Technical test

2.1 Summary of test results

2.2 Test report

1 General information

1.1 Notes

The test results of this test report relate exclusively to the item tested as specified in 1.5.

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1.2 Testing laboratory

CETECOM ICT Services GmbH

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Accredited testing laboratory**DAR-registration number : TTI-P-G-166/98-30****Accredited Bluetooth™ Test Facility (BQTF)**

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1.3 Details of applicant**Name** : Philips Technology Campus Leuven Remote Control Systems**Street** : Interleuvenlaan 74-82**City** : B-3001 Leuven**Country** : Belgium**Telephone** : +32 16 394 554**Telefax** : +32 16 394 900**Contact** : Mr. Gert Heysse**Telephone** : +32 16 394 554**1.4 Application details**

Date of receipt of application : 28.02.2002

Date of receipt of test item : 28.02.2002

Date of test : 28.02.2002

1.5 Test item

Type of equipment : Remote controller for radio equipment with charger unit and data cable

Type designation : **RC5200**

Manufacturer : -applicant-

Street :

City :

Country :

Serial number :

Additional informations: :

Frequency : 418.1 MHz / 180KA1D

Channel separation: -

Number of channels : 1

Antenna : internal wire antenna

Power supply : Tx : 4.8V DC NiCd or 12V DC via AC-adaptor and charger

Max ERP AV : 3198.8 µV/m in 3m AV/ 1.8µW ERP AV/ 2.9 µW EIRP AV

1.6 Test standards**FCC Part §15.231 / §15.209 / §15.207**

2. Technical test

The radiated measurements were performed vertical and horizontal over the whole frequency range. We start at 1 m high with vertical receiving antenna and rotate the dish continuously. During rotation we use the antenna lift system to vary the high from 1 to 4 m. So we find maximum radiation output. At this points we do manual remeasurements. After this we do the same measurements in horizontal position of the receiving antenna. This (horizontal and vertical) is made for all the three planes of the test sample. We use the maximum received results. The detector function and selection of bandwidth are according ANSI C63.2-1996 item 8.2.1 and ANSI C63.4-1992 Item 4.2.

Antennas are conform with ANSI C63.2-1996 item 15.

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

1GHz: Average, RBW 1MHz, VBW 10 MHz, waveguide horn and standard gain horns.

All measurements were performed radiated. We used the FCC approved substitution method to measure the radiated power. Maximum results were received at vertical polarisation, horizontal results were minimum 8 dB lower.

The sample was fixed in the charger unit, powered by the AC adapter with data cable.

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. (only spurious emissions was tested)

FINAL VERDICT : PASS

Technical responsibility for area of testing :

26.03.2002 RSC8411 Berg M.



Date	Section	Name
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26.03.2002	RSC8414	Ames H.
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Date	Section	Name
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2.2 Testreport

TEST REPORT

FCC Part §15.231

Testreport no.: 2_2830-01-01/02

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

The list of measurements called for in FCC Part 15.231 is given below.

Paragraph	PARAMETER TO BE MEASURED	PAGE
	Transmitter parameters	
§15.231 (b)	Maximum field strenght of emission	7
§15.231(a)	Automatic deactivation	10
§15.231(d)	Bandwidth of emission	11
§15.231(d)	Frequency tolerance	12
§15.207	Conducted emissions	14
	Test equipment listing	15
	Photographs of the equipment	17

Equipment under test : RC5200

Ambient temperature : 21°C

Relative humidity : 45 %

EMISSION LIMITATIONS RADIATED (418.1 MHz)

§15.231(b)

EMISSION LIMITATIONS					
all measurements are made up to the 10 th harmonic at 3m					
f (MHz)	polarization	amplitude of emission (µV/m)	limit max. allowed emission power (interpolation)	actual attenuation below frequency of operation (dB)	results
418.1	vertical	3198.8	10333 µV/m	-	Operating frequency
836.2	vertical	63.1	1033.3 µV/m 200µV/m (209)	34.1	complies
1254.3	vertical	59.6	916,7 µV/m 500µV/m (209)	34.6	complies
1672.5	vertical	66.1	916,7 µV/m 500µV/m (209)	33.7	complies
2090.5	vertical	51.3	916,7 µV/m 500µV/m (209)	35.9	complies
2508.7	vertical	42.7	916,7 µV/m 500µV/m (209)	37.5	complies
4181.2	vertical	22.4	916,7 µV/m 500µV/m (209)	43.1	complies
4599.2	vertical	101.2	916,7 µV/m 500µV/m (209)	30.0	complies
5017.4	vertical	40.3	916,7 µV/m 500µV/m (209)	38.0	complies
All other peaks > 10 db below the Limit §15.209 (see plots)					
Measurement uncertainty		± 3dB			

LIMITS

SUBCLAUSE § 15.231

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : RC5200

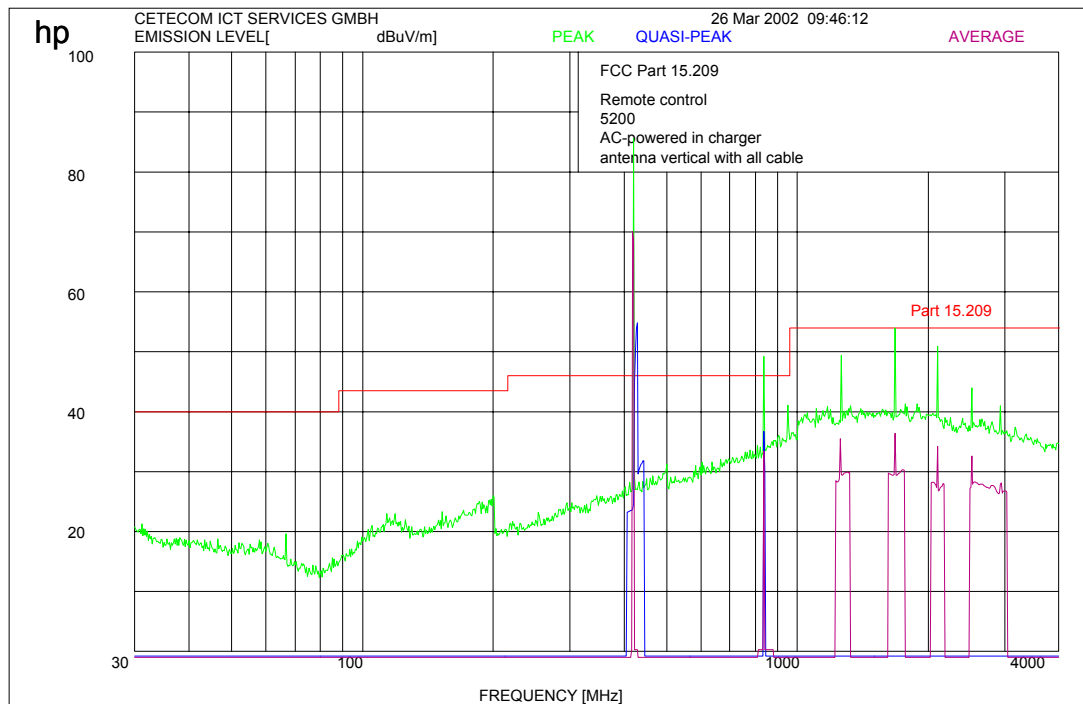
Ambient temperature : 21°C

Relative humidity : 45 %

EMISSION LIMITATIONS (418.1 MHz)

§15.231(b)

Vertical (worst case)



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.231

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : RC5200

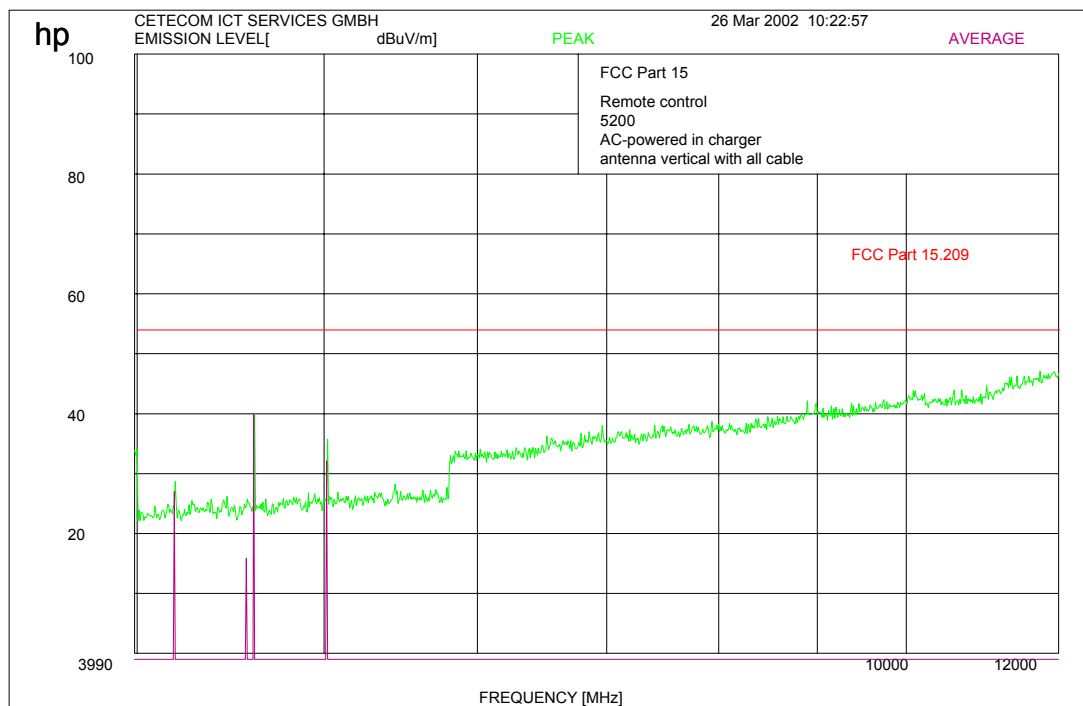
Ambient temperature : 21°C

Relative humidity : 45 %

EMISSION LIMITATIONS (418.1 MHz) > 4 GHz

§15.231(b)

Vertical (worst case)



f < 1 GHz : RBW/VBW: 100 kHz

f ≥ 1GHz : RBW/VBW: 1 MHz

LIMITS

SUBCLAUSE § 15.231

The maximum permitted unwanted emission level is 20dB below the maximum permitted fundamental level. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Test report no.: **2_2830-01-01/02** Issue Date: 2002-03-27 Page 10 (27)

Equipment under test : RC5200

Ambient temperature : 21°C

Relative humidity : 45 %

AUTOMATIC DEACTIVATION

SUBCLAUSE § 15.231 (a)

The transmitter stops transmission immediately after releasing the buttons.

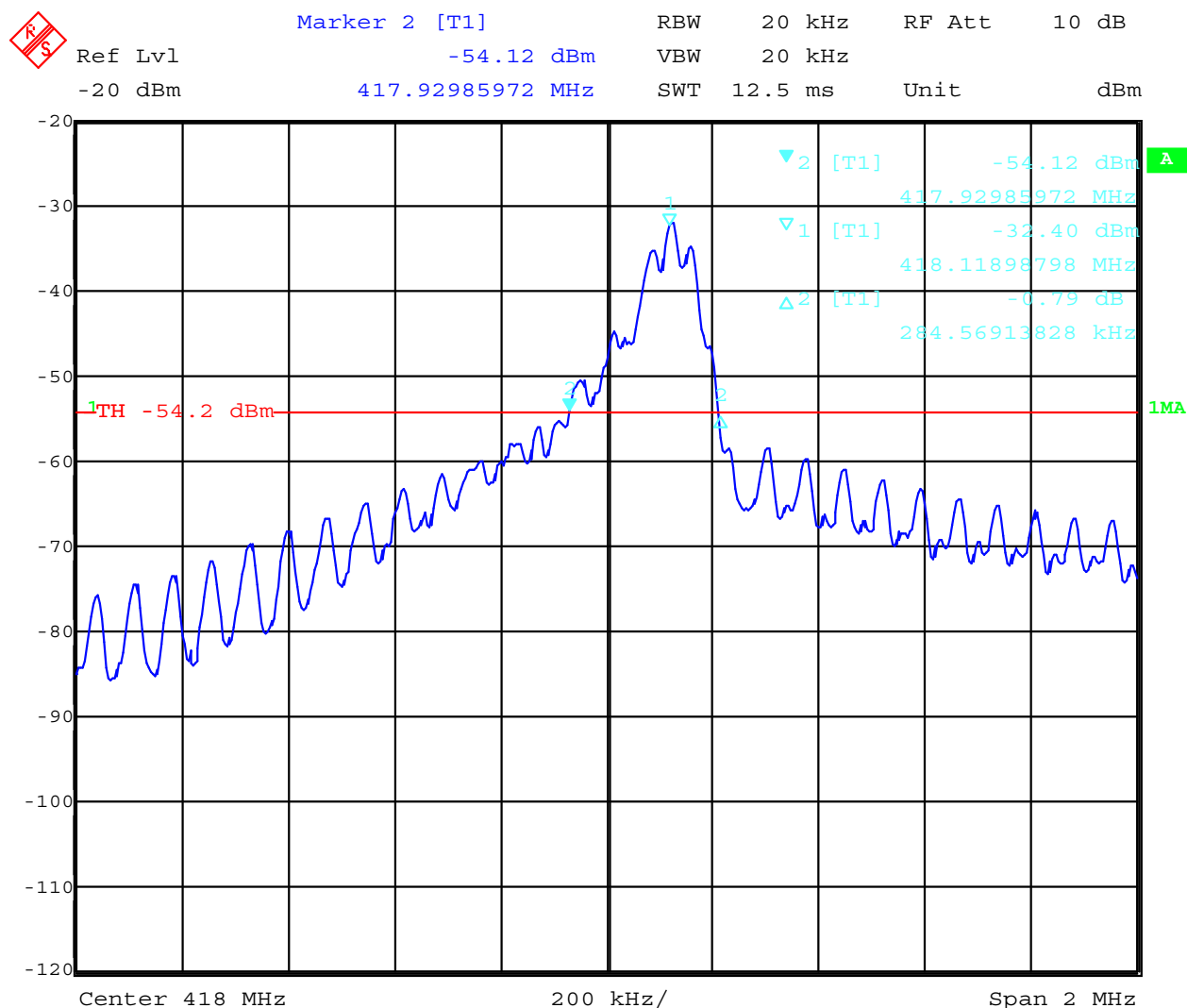
Equipment under test : **RC5200**

Ambient temperature : **21°C**

Relative humidity : **45 %**

Bandwidth of emissions

SUBCLAUSE § 15.231 (c)



Date: 26.MAR.2002 13:36:14

The 20dB Bandwidth is : **284.57 KHz**

Limit for 390 MHz : **1045 KHz**

LIMITS:

§15.231(c)

The bandwidth of emission shall be no wider than 0.25% of the center frequency

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 , 05

Equipment under test : RC5200

Ambient temperature : 21°C

Relative humidity : 45 %

AFC FREQ ERROR vs. VOLTAGE

SUBCLAUSE § 15.231 (d)

Factor [%]	nom. Voltage	Voltage [V]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
0,85	12V	10.2	-120	418.119		-0.287
0,87		10.5	-120	418.119		-0.287
0,90		10.8	-120	418.119		-0.287
-120		11.1	-120	418.119		-0.287
-120		11.4	-120	418.119		-0.287
-120		11.7	-120	418.119		-0.287
1,00		12.0	-120	418.119		-0.287
1,02		12.3	-120	418.119		-0.287
1,05		12.6	-120	418.119		-0.287
1,07		12.9	-120	418.119		-0.287
1,10		13.2	-120	418.119		-0.287
1,12		13.5	-120	418.119		-0.287
1,15		13.8	-120	418.119		-0.287

AFC FREQ ERROR vs. TEMPERATURE

Temperature [° C]	Frequency error [Hz]	Frequency [MHz]	Error in %	Error in ppm
-20°	-130	418.119		-0,3109
-10°	-130	418.119		-0,3109
0,0°	-120	418.119		-0,2870
+10°	-120	418.119		-0,2870
+20°	-120	418.119		-0,2870
+30°	-120	418.119		-0,2870
+40°	-110	418.119		-0,2631
+50°	-110	418.119		-0,2631

LIMITS:

§15.231 (d)

Under all test conditions	± 0.01%
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REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

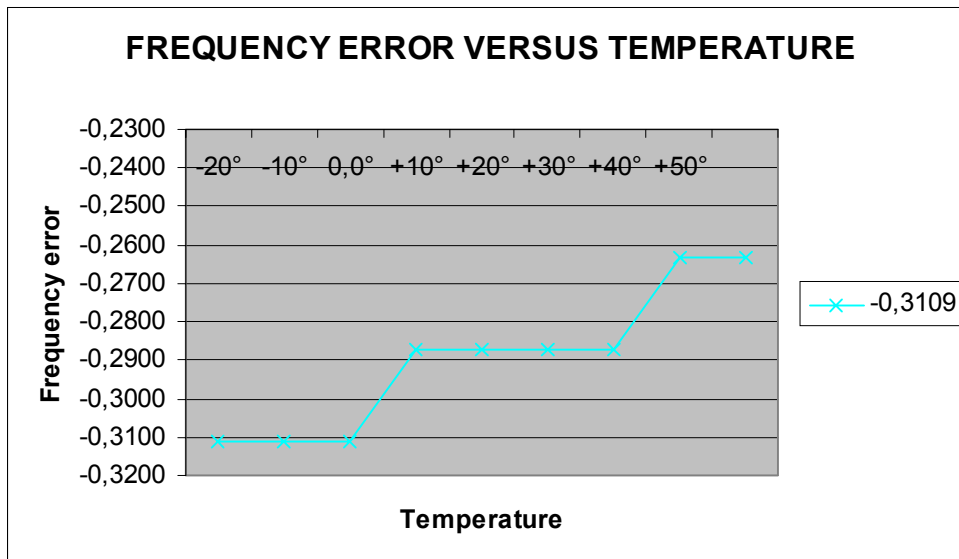
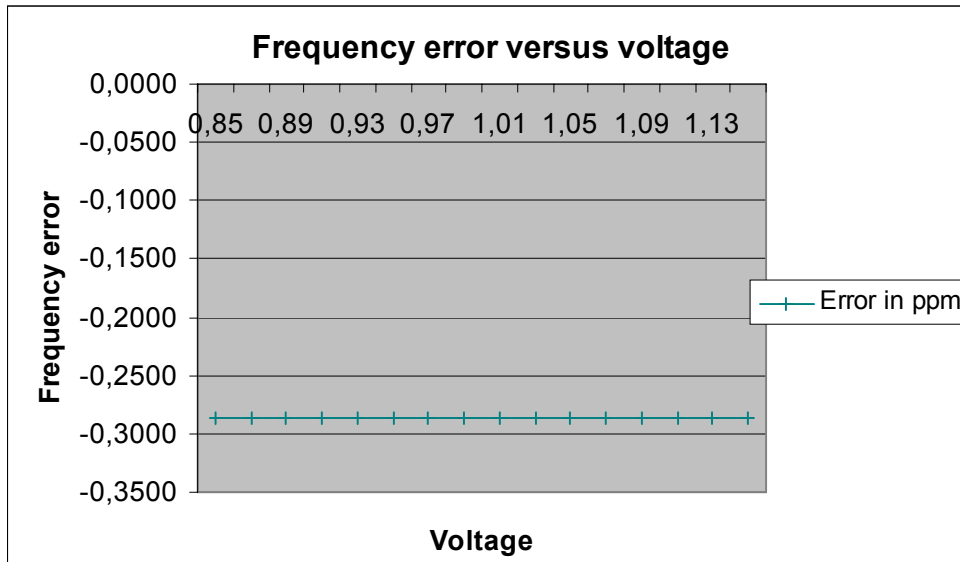
(for reference numbers see test equipment listing)

01 , 05

Equipment under test : RC5200

Ambient temperature : 21°C

Relative humidity : 45 %



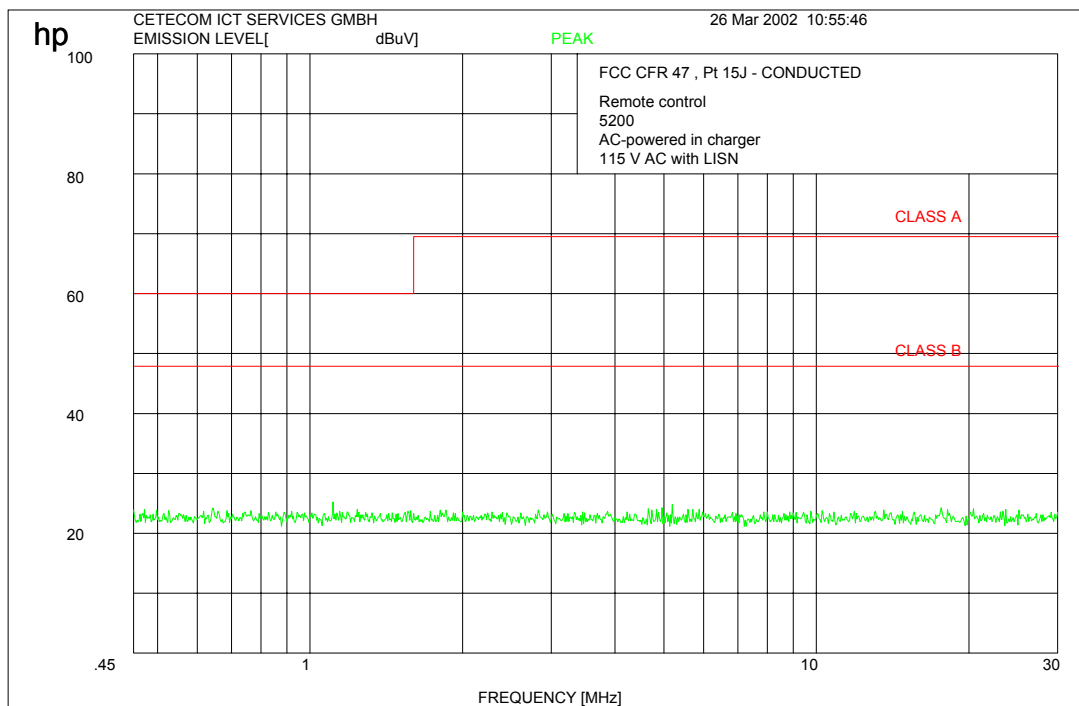
REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

01 , 05

Conducted emissions, L1 and L2 checked

SUBCLAUSE § 15.207



There were no peaks found.

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 Reciever	ESMI	Rohde & Schwarz	827 063/010
35	EMI Test Receiver	Display	Rohde & Schwarz	829 808/010

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.
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
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