

CETECOM ICT Services GmbH

Radio Satellite Communication

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RSC14

addendum to test report consist of

15 Pages

Page 1 (15)

Akkreditiertes Prüflaboratorium

**DAR-Registriernummer:
TTI-P-G 166/98-00 vom 18.09.98**

**Addendum to
Test report no.:2_1843-A/99
FCC Part 15.231
Theimeg HANDY**

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

66117 Saarbrücken

Untertürkheimer Straße 6 - 10

Deutschland

Telefone : + 49 681 598 - 9000

Telefax : + 49 681 598 - 9075

E-mail : Harro.Ames@ict.cetecom.de

Internet : www.cetecom.de

Accredited testing laboratory

DAR-registration number : TTI-P-G-166/98-00 vom 18.09.98

1.3 Details of applicant

Name : Theimeg Elektrogeräte GmbH

Street : Clöratherstrasse 3

City : D-41748 Viersen

Country : Germany

Telephone : +49 2162 3720

Telefax : +49 2162 3724

Contact : Mr. Herrmann

Telephone : +49 2161 3720

1.4 Application details

Date of receipt of application : 08.09.99

Date of receipt of test item : 08.09.99

Date of test : 08.09.99

1.5 Test item

Type of equipment : remote control transmitter

Type designation : **HANDY**

Manufacturer : applicant

Street :

City :

Country :

Additional informations: :

Frequency : 412 – 466 MHz
during test 412.675 and 465.025
MHz

Channel separation: 25 kHz
opt. 12.5 kHz

Number of channels : max 64

Antenna : build -in

Power supply : Tx: 7.2V DC NiCd -Accu

Type of equipment : . - .

Unmodulated carrier : not possible

1.6 Test standards

FCC Part 15.231 and 15.209

The following tests were made to test that the regulations of the FCC Part 15.231 and FCC Part 15.209 are fulfilled.

As the transmitter can work over a big range of frequency additional tests were made on the band edges.

This addendum belongs to the test report 2-1843-A/99.

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 :

26.01.2000 RSC8414 Ames H.

Date

Section

Name

Signature

26.01.2000 RSC8411 Berg M.

Date

Section

Name

Signature

2.2 Testreport

TEST REPORT

FCC Part 15.231

FCC Part 15.209

Addendum to testreport no.: 2_1843-A/99

TEST REPORT REFERENCE

LIST OF MEASUREMENTS

The list of measured parameters called for in FCC Part 15.231 and FCC Part15.209 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	9
§15.231 (c)	Bandwidth of emission	10
	Test equipment listing	12

Equipment under test HANDY**Ambient temperature** : 20° C**Relative humidity** : 48 %**EMISSION LIMITATIONS (412.675 MHz)****SUBCLAUSE § 15.231 (b)****§ 15.209**

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 emmission power (interpolation)	actual attenuation below frequency of operation (dB)	results
412.675	vertical	2600	11660 µV/m	-	Operating frequency
2063.4	vertical	480	1166 µV/m 500µV/m (209)	14	complies
2476.1	vertical	312	1166 µV/m 500µV/m (209)	18	complies
>2476.1	vertical	no peak found	1166 µV/m 500µV/m (209)		complies
Measurement uncertainty		± 3dB			

LIMITS**SUBCLAUSE § 15.231 (c)**

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the permitted fundamental power. 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)).

All measurements are made with a CISPR quasi-peak equipment.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test HANDY**Ambient temperature** : 20° C**Relative humidity** : 48 %**EMISSION LIMITATIONS (465.025 MHz)****SUBCLAUSE § 15.231 (b)****§ 15.209**

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 emmission power (interpolation)	actual attenuation below frequency of operation (dB)	results
465.025	vertical	2018	11660 µV/m	-	Operating frequency
2325.1	vertical	412	1166 µV/m 500µV/m (209)	14	complies
2790.1	vertical	240	1166 µV/m 500µV/m (209)	18	complies
>2790.1	vertical	no peak found	1166 µV/m 500µV/m (209)		complies
Measurement uncertainty		± 3dB			

LIMITS**SUBCLAUSE § 15.231 (c)**

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the permitted fundamental power. 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)).

All measurements are made with a CISPR quasi-peak equipment.

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test **HANDY**
Ambient temperature **: 20° C**
Relative humidity **: 48 %**

AUTOMATIC DEACTIVATION

SUBCLAUSE § 15.231 (a)

The transmitter is automatically deactivated within 5 seconds of being released.

Equipment under test HANDY

Ambient temperature : 20° C

Relative humidity : 48 %

Bandwidth of emissions

SUBCLAUSE § 15.231 (c)

TEST CONDITIONS 412,675 MHz		FREQUENCY (MHz) at which –20 dBc occurs max ±1.03 MHz at 412 MHz	
		low	high
$T_{nom}(20)^{\circ}C$	$V_{nom}(7.2)V$	412.663	412.689
Measured frequencies (lowest and highest)		$f_L = 412.663 \text{ MHz}$	$f_H = 412.689 \text{ MHz}$
Measurement uncertainty		$\pm 1 \times 10^{-5}$	

LIMITS:

§15.231

Under all test conditions	no wider than 0.25% of the center frequency between 70 to 900 MHz, 0.5% above 900MHz. Bandwidth is determined at 20dB below modulated carrier.
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REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Bandwidth of emissions

SUBCLAUSE § 15.231 (c)

TEST CONDITIONS		FREQUENCY (MHz) at which -20 dBc occurs max ±1.163 MHz at 465 MHz	
465.025 MHz		low	high
$T_{nom}(20)^{\circ}C$	$V_{nom}(7.2)V$	465.014	465.037
Measured frequencies (lowest and highest)		$f_L = 465.014 \text{ MHz}$	$f_H = 465.037 \text{ MHz}$
Measurement uncertainty		$\pm 1 \times 10^{-5}$	

LIMITS:

§15.231

Under all test conditions	no wider than 0.25% of the center frequency between 70 to 900 MHz, 0.5% above 900MHz. Bandwidth is determined at 20dB below modulated carrier.
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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 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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