

**Akkreditiertes Prüflaboratorium**

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

**Test report no.: 2\_1612-B/99  
FCC 47 Part 74.802  
SKP 500 / SKP 100**

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### 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

Telephone: + 49 681 598 - 9000

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-166/98-00 vom 18.09.98**

## 1.3 Details of applicant

Name : Sennheiser electronic GmbH & Co. KG

Street : Am Labor 1

City : D-30900 Wedemark

Country : Germany

Telephone : +49 (0) 5120 / 600-0

Telefax : +49 (0) 5120 / 600-330

Contact : Mr. Klaus Willemsen

Telephone : +49 (0) 5120 / 600-542

## 1.4 Application details

Date of receipt of application : 27.08.1999

Date of receipt of test item : 27.08.1999

Date of test : 31.08.1999

## 1.5 Test item

Type of equipment : Wireless Transmitter

Type designation : **SKP 500 , SKP 100**

Manufacturer : applicant

Street :

City :

Country :

Serial number : 10000015 , 10000007 , 10000007

**Additional informations: :**

Frequency : 518 – 870 MHz Modulation:180KF3E

Number of channels : 1280 in 25 kHz steps

Antenna : Integral antenna

Power supply : 9V DC alkaline battery

Type of equipment : not applicable

Unmodulated carrier : not applicable

## 1.6 Test standards

**CFR 47, Part 74 Subpart H**

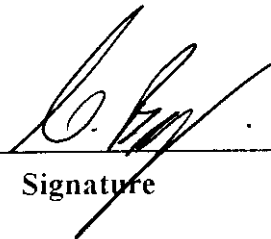
2 Technical test

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 :

02.09.99            RSC8411    Berg M.  
Date                Section     Name

  
Signature

Technical responsibility for area of testing :

02.09.99            RSC8414    Ames H.  
Date                Section     Name

  
Signature

2.2 Testreport

**TEST REPORT**

Testreport no.: 2\_1612-B/99

## TEST REPORT REFERENCE

### LIST OF MEASUREMENTS

PARAMETER TO BE MEASURED	PAGE
Transmitter parameters	
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Equipment under test : SKP 500 / SKP 100  
 Ambient temperature : 23°C  
 Relative humidity : 62%

**EFFECTIVE RADIATED POWER**

**FCC Rule Part 74.861**

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

TEST CONDITIONS		TRANSMITTER POWER (mW)				
		518.100	646.000	756.000	806.000	870.000
Frequency (MHz)						
T <sub>nom</sub> ( 23 )°C	V <sub>nom</sub> ( 9.0 )V	2.57	8.32	13.49	6.61	15.14
Maximum deviation from output power under extreme test conditions (dBc)		+1.9	+2.8	-3.6	+2.1	±1.2
Measurement uncertainty		±3dB				

**LIMIT**

**FCC Rule Part 74.861**

Frequency range MHz	Power level radiated mW
54-72, 76-88, 174-216	50
470-608, 614-806	250

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

Equipment under test : SKP 500 / SKP 100  
 Ambient temperature : 23°C  
 Relative humidity : 62%

**FREQUENCY STABILITY**

TEST CONDITIONS		FREQUENCY (MHz)				
Theoretical Frequencies (MHz)		518.000	646.000	756.000	806.000	870.000
T <sub>min</sub> (23)°C	V <sub>min</sub> ( 7.65 )V	518.00076	646.00008	755.99952	806.00078	869.99979
	V <sub>max</sub> ( 10.35 )V	518.00078	646.00010	755.99958	806.00075	869.99982
Limit (MHz)		517.9741 to 518.0259	645.96770 to 646.00323	755.96220 to 756.03780	805.95970 to 806.04030	869.95650 to 870.4350
Measurement uncertainty		$< \pm 10^{-7}$				

LIMIT

FCC Rule Part 74.861

The frequency tolerance of the transmitter shall be 0.005 percent



Equipment under test : SKP 500 / SKP 100  
 Ambient temperature : 23°C  
 Relative humidity : 62%

TEMPERATURE VARIATION :

TEST CONDITIONS	FREQUENCY (MHz)				
	Theoretical Frequencies (MHz)	518.100	646.000	756.000	806.000
Temperature(°Celsius)					
-30	518.0008	645.9962	755.9895	806.0005	869.9918
-20	518.0013	645.9982	755.9939	806.0026	869.9961
-10	518.0026	645.9998	755.9967	806.0033	869.9983
0.0	518.0031	646.0006	755.9987	806.0033	869.9995
+10	518.0021	646.0003	755.9996	806.0020	869.9998
+20	518.0008	645.9999	755.9995	806.0011	870.0003
+30	517.9998	645.9996	756.0001	805.9998	870.0007
+40	517.9995	645.9996	756.0007	805.9991	870.0010
+50	517.9991	645.9993	756.0011	805.9990	870.0011
Limit (MHz)	517.9741 to 518.0259	645.96770 to 646.00323	755.96220 to 756.03780	805.95970 to 806.04030	869.95650 to 870.4350
Measurement uncertainty	$< \pm 10^{-7}$				

LIMIT

FCC Rule Part 74.861

The frequency tolerance of the transmitter shall be 0.005 percent

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

Equipment under test : SKP 500 / SKP 100

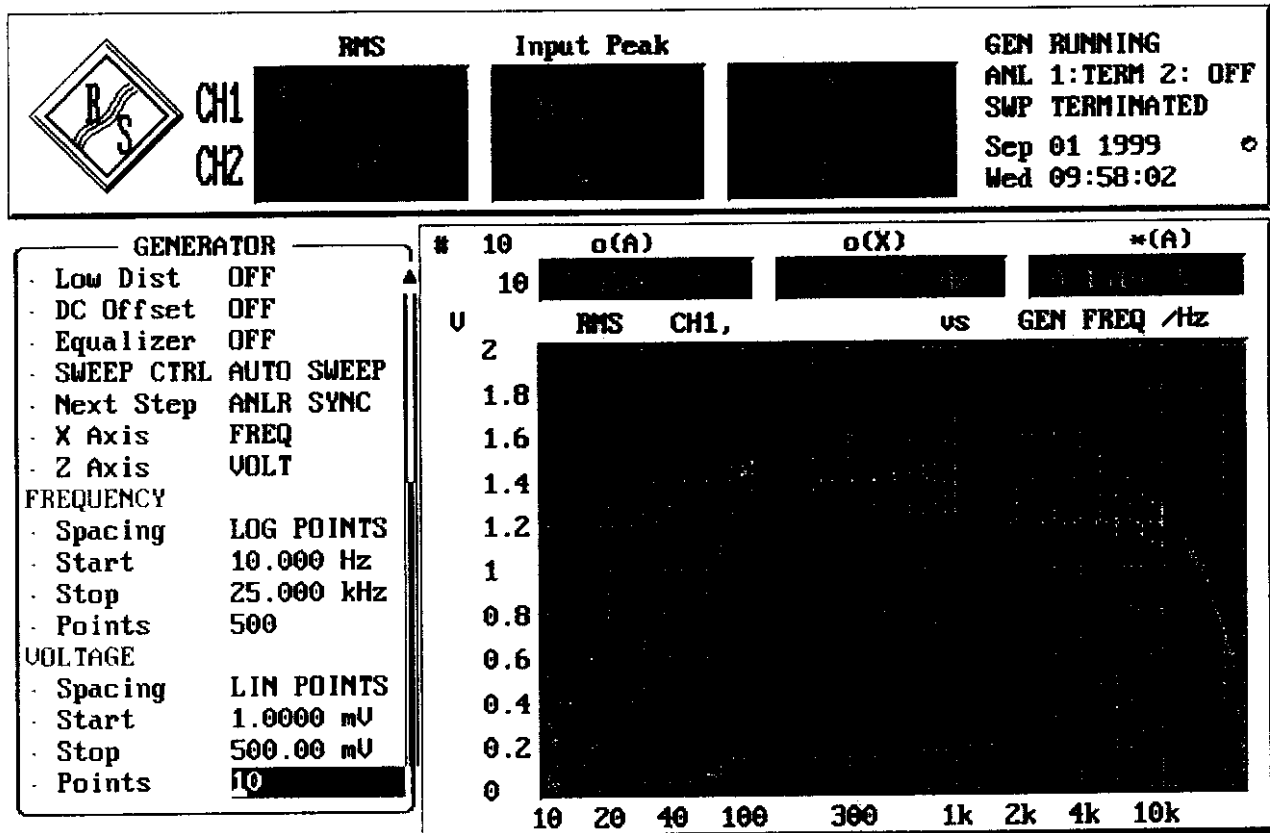
Ambient temperature : 23°C

Relative humidity : 62%

## CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY

FCC Rule Part 74 Sec. 2.987

Frequency: 518.000 MHz



Equipment under test : SKP 500 / SKP 100


Ambient temperature : 23°C

Relative humidity : 62%

**CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY**

FCC Rule Part 74 Sec. 2.987

Frequency: 756.000 MHz

	CH1	RMS	Input Peak	GEN RUNNING
	CH2			ANL 1:TERM 2: OFF
				SMP TERMINATED
				Sep 01 1999
				Wed 10:13:22

<b>GENERATOR</b> · Low Dist OFF · DC Offset OFF · Equalizer OFF · SWEEP CTRL AUTO SWEEP · Next Step ANLR SYNC · X Axis FREQ · Z Axis VOLT <b>FREQUENCY</b> · Spacing LOG POINTS · Start 10.000 Hz · Stop 25.000 kHz · Points 500 <b>VOLTAGE</b> · Spacing LIN POINTS · Start 1.0000 mV · Stop 500.00 mV · Points 10		<table border="1"> <tr> <td>#</td> <td>10</td> <td>o(A)</td> <td>o(X)</td> <td>* (A)</td> </tr> <tr> <td>U</td> <td>2.2</td> <td>RMS CH1,</td> <td>us</td> <td>GEN FREQ /Hz</td> </tr> <tr> <td></td> <td>2</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1.8</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1.6</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1.4</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1.2</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>1</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0.8</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0.6</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0.4</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0.2</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>10</td> <td>20</td> <td>40</td> </tr> <tr> <td></td> <td></td> <td>100</td> <td>300</td> <td>1k</td> </tr> <tr> <td></td> <td></td> <td>2k</td> <td>4k</td> <td>10k</td> </tr> </table>	#	10	o(A)	o(X)	* (A)	U	2.2	RMS CH1,	us	GEN FREQ /Hz		2					1.8					1.6					1.4					1.2					1					0.8					0.6					0.4					0.2					0						10	20	40			100	300	1k			2k	4k	10k
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Equipment under test : SKP 500 / SKP 100

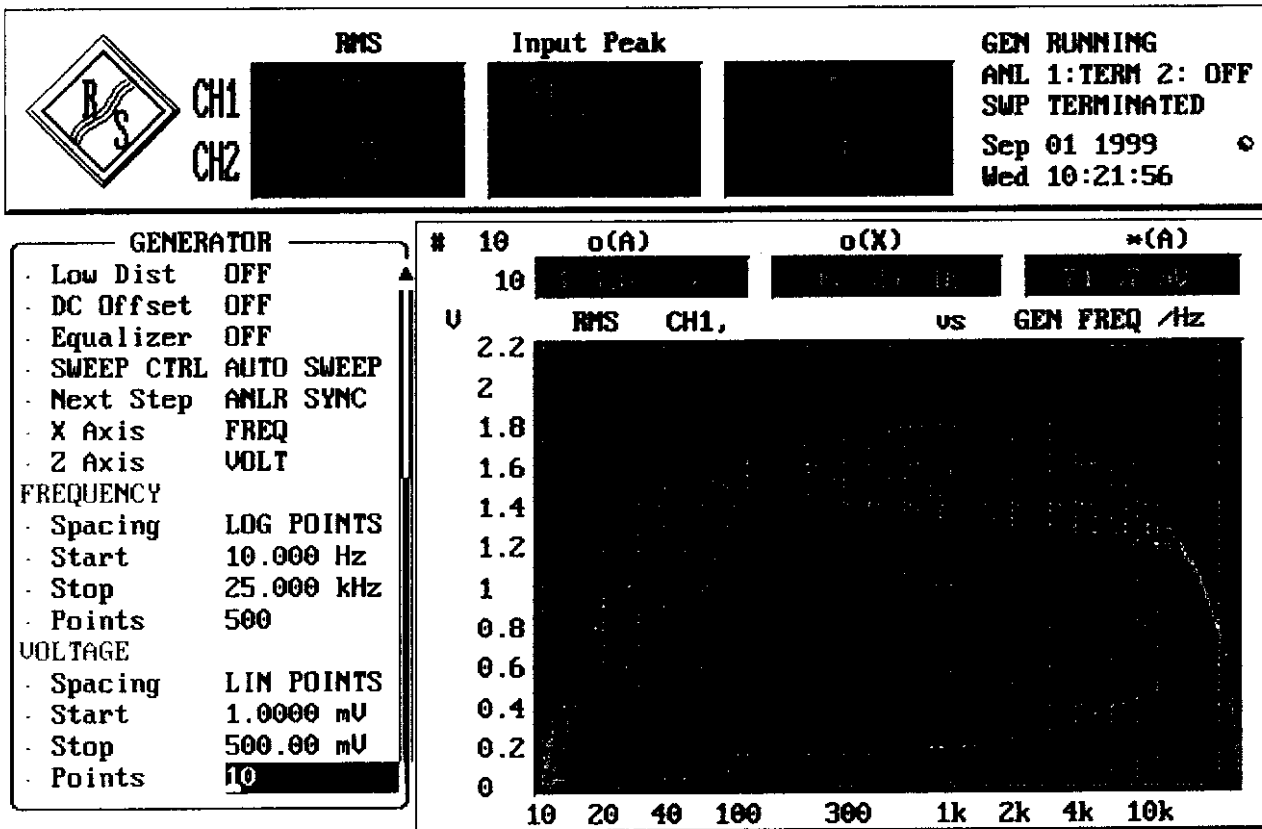
Ambient temperature : 23°C

Relative humidity : 62%

## CHARACTERISTICS OF THE AUDIO MODULATION CIRCUITRY

FCC Rule Part 74 Sec. 2.987

Frequency: 870.000 MHz



Equipment under test : SKP 500 / SKP 100

Ambient temperature : 23°C

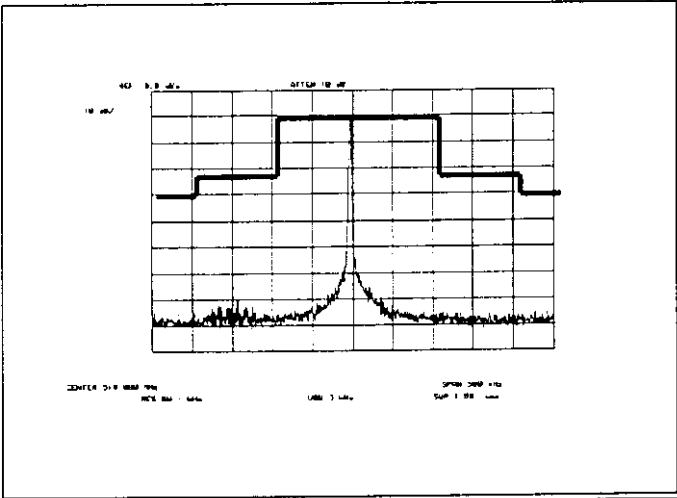
Relative humidity : 62%

**OCCUPIED BANDWIDTH**

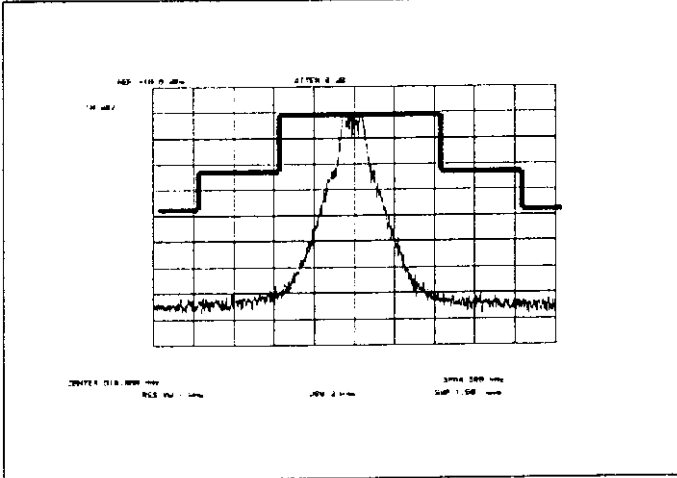
FCC Rule Part 74 Sec. 2.989

Frequency: 518.000 MHz

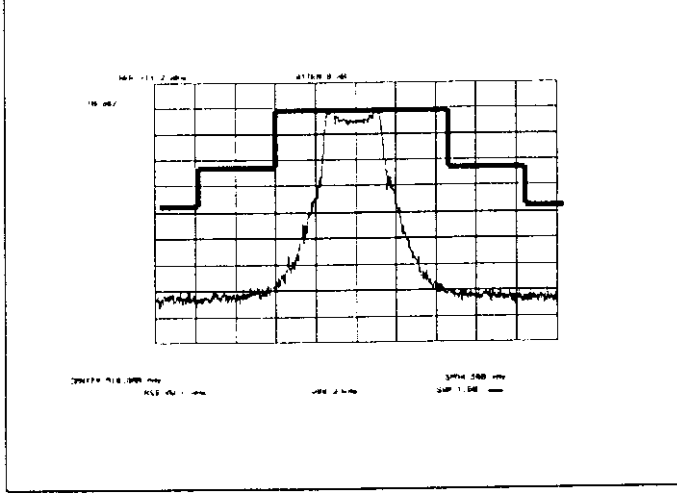
Unmodulated Carrier



50% Modulation



85% Modulation



Equipment under test : SKP 500 / SKP 100

Ambient temperature : 23°C

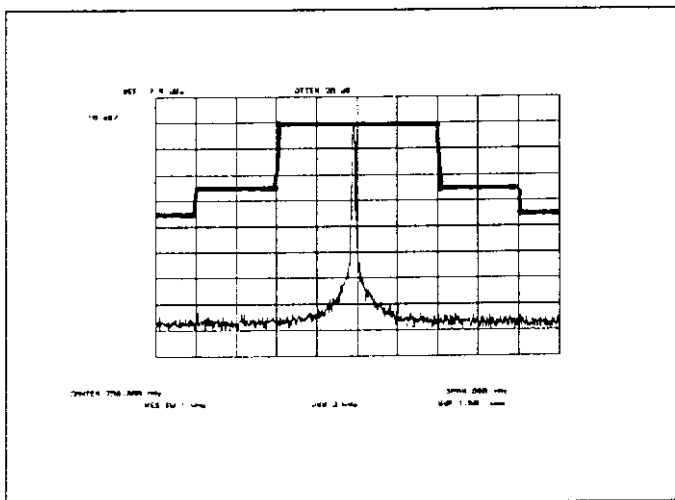
Relative humidity : 62%

**OCCUPIED BANDWIDTH**

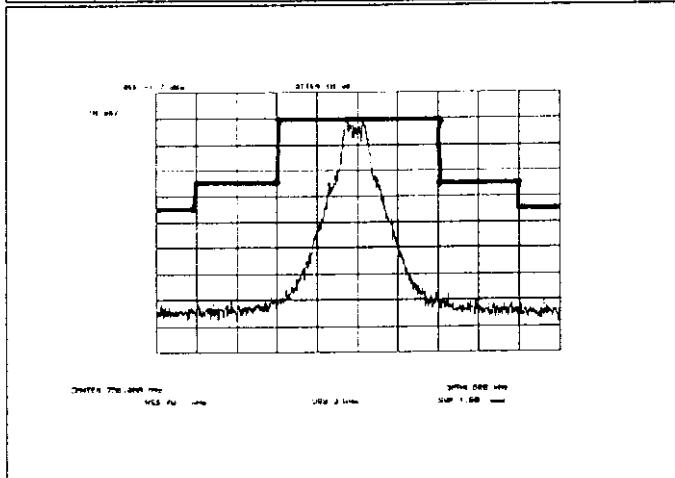
FCC Rule Part 74 Sec. 2.989

Frequency: 756.000 MHz

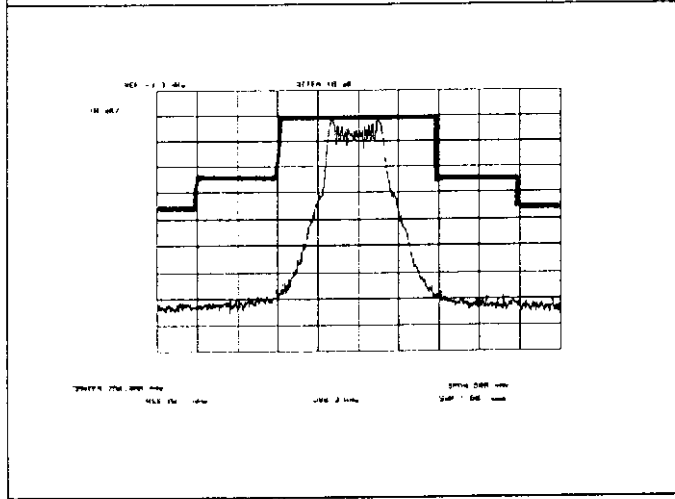
Unmodulated Carrier



50% Modulation



85% Modulation



Equipment under test : SKP 500 / SKP 100

Ambient temperature : 23°C

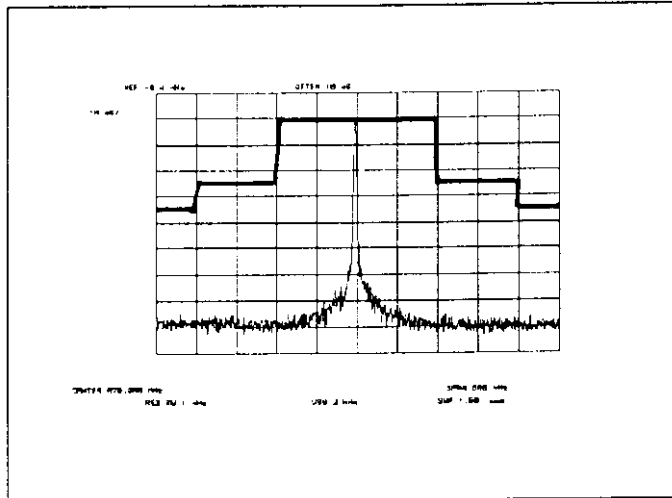
Relative humidity : 62%

**OCCUPIED BANDWIDTH**

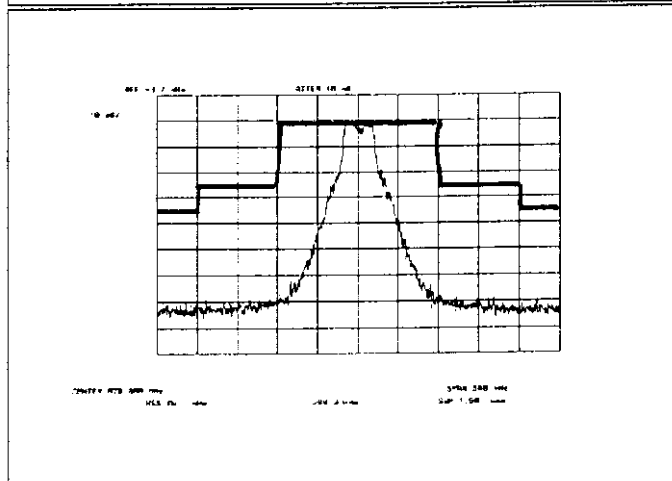
FCC Rule Part 74 Sec. 2.989

Frequency: 870.000 MHz

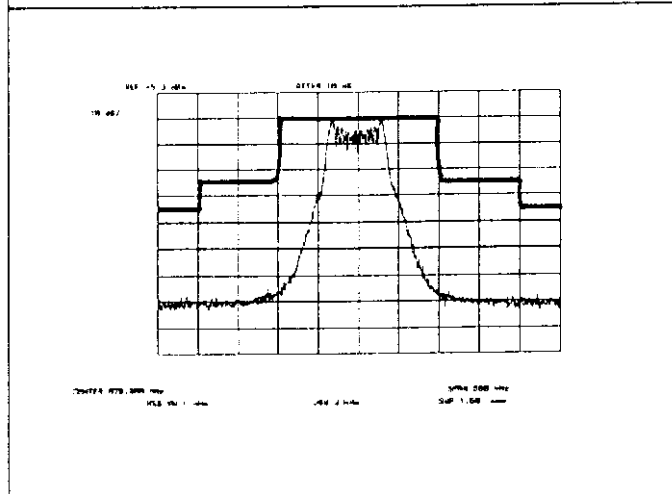
Unmodulated Carrier



50% Modulation



85% Modulation



REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)

Equipment under test : SKP 500 / SKP 100

Ambient temperature : 23°C

Relative humidity : 62%

## RADIATED EMISSIONS

FCC Rule Part 74 subpart H

Power level at which the measurement has been performed :

518.100 MHz	646.000 MHz	756.000 MHz
2.57 mW / +4.10 dBm	8.23 mW / +9.20 dBm	13.49 mW / +11.30 dBm

Transmitter operating

SPURIOUS EMISSIONS LEVEL (dBm)								
518.100 MHz			646.000 MHz v			756.000 MHz		
f (MHz)	Bandwidth (kHz)	Level (dBm)	f (MHz)	Bandwidth (kHz)	Level (dBm)	f (MHz)	Bandwidth (kHz)	Level (dBm)
1036.0	1000	-51,0	no	peak	found	no	peak	found
Measurement uncertainty			± 3dB					

Bandwidth (kHz); this refers to the bandwidth of the measurement receiver

Limits

FCC Rule Part 74.861(e)(6)

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 +10 log <sub>10</sub> (mean output power in watts) dB below the mean output power

REFERENCE NUMBER(S) OF TEST EQUIPMENT USED

(for reference numbers see test equipment listing)



Equipment under test : SKP 500 / SKP 100

Ambient temperature : 23°C

Relative humidity : 62%

**RADIATED EMISSIONS**

**FCC Rule Part 74 subpart H**

Power level at which the measurement has been performed :

806.000 MHz	870.000 MHz	
6.61 mW/+8.20 dBm	15.14 mW / +11.90 dBm	

Transmitter operating

SPURIOUS EMISSIONS LEVEL (dBm)								
806.000 MHz			870.000 MHz					
f (MHz)	Bandwidth (kHz)	Level (dBm)	f (MHz)	Bandwidth (kHz)	Level (dBm)	f (MHz)	Bandwidth (kHz)	Level (dBm)
no	peak	found						
			1740	1000	-57.5			
			2610	1000	-64,3			
Measurement uncertainty			± 3dB					

Bandwidth (kHz); this refers to the bandwidth of the measurement receiver

Limits

FCC Rule Part 74.861(e)(6)

f ± 100 kHz to f ± 200 kHz	f ± 200 kHz to f ± 500 kHz	f ± 500 kHz
25 dBc	35 dBc	-43 + 10 log <sub>10</sub> (mean output power in watts) dB below the mean output power

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

## 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
51	Audio Analyzer	UPD	Rohde & Schwarz	1030.7500.04
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