F C C -
TESTREPORT

REPORT NO.: FCC-02/12-0208

pkm electronic GmbH
Ohmstrasse 1
D-84160 Frontenhausen
Tel : 08732 - 6381
Fax : 08732 - 2345
e-mail: pkm.accredited-labs@t-online.de

TABLE OF CONTENTS

1.Client information:

Name:	DAEWOO Electronics Co., Ltd.
Address::	Microwave Oven R&D Center, # 412-2, Chungchun Dong, Bupyong-Gu Incheon, 403-032 / KOREA
Name of contact:	Mr. Seong O. Kim, Manager
Telephone:	0082 / 32 510 7917
Fax:	0082 / 32 527 7461

2. Equipment under Test:

2.1 Identification of the EUT

Equipment:	Microwave Oven
Model:	KOR-131G
Brand name:	Daewoo
Serial-No.:	-/-
Manufacturer:	DAEWOO Electronics Co., Ltd. Microwave Oven R&D Center, # 412-2, Chungchun Dong, Bupyong-Gu Incheon, 403-032 / KOREA
Country of origin:	KOREA
Rating:	120V, 60HZ, AC only, 1.4kW

2.2 Additional information about the EUT

The EUT consists of the following parts:

Component	Type / model	Technical data	Maker
Magnetron	RM228	2.450GHz	Daewoo

3. Test Site

3.1. Semi-anechoic chamber

Measurement of radiated emissions from EUT was made at semi-anechoic chamber that has been in compliance with Federal Communications Commissions (FCC) requirements of clause 2.948 according to ANSI C63.4-1992 on April 6, 2000.

4. CALIBRATIONS OF MEASURING INSTRUMENTS

All measurements were made with instruments calibrated according to the requests of EN/IEC 17025 according to which the test site is accredited. Measurement of radiated emissions was made with instruments conforming to American National Standard Specification, ANSI C63.4-1992. The calibration of measuring instrument, including any accessories that may affect test results, was performed according to the requests of EN/IEC 17025.

5. DESCRIPTION OF TEST CONDITION

5.1 Radiated emissions measurements

5.1.1 Test site

Measurements were made in semi-anechoic chamber as described at 3.1 in this report.

5.1.2 Detector function selection and bandwidth

In radiated emissions measurement, field strength meters that has CISPR quasi-peak and average detector were used. The bandwidth of the detector of instrument is 120 KHz over frequency range of 30 to 1000 MHz, and 1 MHz over frequency range of 1 to 18 GHz. Emissions to be measured are detected in average mode.

5.1.3 Unit of measurement

Test results of radiated emissions measurement are reported in microvolts per meter at the specific distance. Using the unit of dBuV on the test instrument, indication unit was converted to field strength unit of uV/m as following method for frequencies 30MHz – 1000MHz;

$$F/S = 10^{[(R + CF)/20]}$$

here,

F/S: Field strength in µV/m
R: Meter reading in dB(µV)
CF: Correction factor (includes cable loss, antenna factor, field deviation)

For frequencies above 1000MHz;

$$F/S = 10^{[(R + CF-AG)/20]}$$

here,

F/S: Field strength in µV/m
R: Meter reading in dB(µV)
CF: Correction factor (includes cable loss, antenna factor, field deviation, filter loss)
AG: Preamplifier gain

5.1.4 Antennas

Measurements were made using calibrated bilog antenna in range of 30 to 1000 MHz and horn antenna in range of 1 to 18 GHz to determine the emission characteristics of the EUT. Measurements were also made for both horizontal and vertical polarization.
The horizontal distance between the receiving antenna and the closest periphery of the EUT was 3 meters.

5.1.5 Frequency range to be scaned

For radiated emissions measurements, the spectrum in the range of 30 to 1000 MHz and above, if found, was investigated.

5.1.6 Test conditions and configuration of EUT

The EUT was configured and operated in all modes of operation so as to find the maximum RF energy generated from EUT.
The power was furnished with rated (normal) AC 120 volts, as specified in the Owner's manual of EUT. The EUT was placed on a 1 m high non metallic 1m diameter table. The turn table containing the system was rotated and the antenna height was varied 4 m to find the maximum RF energy generated from EUT.
Each type of accessory provied by manufacturer or typically used and support equipment were connected to the EUT during measurements to the typical usage and applicable as nearly as practicable.

5.1.7 Measurement uncertainty

Radiated emissions measurements, bilog antenna: $\pm$ 4.9dB
Radiated emissions measurements, horn antenna: $\pm$ 5.0dB

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT in the above mentioned way.

The measurements uncertainty was calculated in accordance with NAMAS NIS 81: "The treatment of uncertainty in EMC measurement".

The measurement uncertainty was given with a confidence of 95%.

6. MEASURING INSTRUMENTS AND SET-UP

6.1 Radiated emission

6.1.1 Test receiver

a) Rohde & Schwarz, Model ESHS-30 (20MHz – 1000MHz)
Detector function: Average
IF bandwidth: 120kHz

b) Rohde & Schwarz, Model FSMS 26 (100Hz – 26.5GHz)
Detector function: Average
IF bandwidth: 1MHz

6.1.2 Receiving antennas

a) Chase, Model CBL6111: Bilog antenna(30MHz – 1000MHz)
b) Electro Metrics, Model RGA-60 Horn antenna(1GHz – 18GHz)

6.1.3 Preamplifier / filter

Model MWPAFB003: Amplifier/Filter bank 1GHz – 18GHz
Amplifier gain 30dB

6.2. Frequency measurements

6.2.1 Test receiver

Rohde & Schwarz, Model FSMS 26 (100Hz – 26.5GHz)
Detector function: Average
IF bandwidth: 1MHz

6.2.2 Receiving antennas

Electro Metrics, Model RGA-60 Horn antenna(1GHz – 18GHz)

7. RF POWER OUTPUT MEASUREMENT AND RESULTS

The Calorimetric Method was used to determine maximum output power. A 1000 ml water load was placed in the center of the oven. A mercury thermometer was used to measure temperatur rise.

$$Power(W) = \frac{(4.2 Joules / Cal) * (Volume\,in\,ml) * (Temperature\,rise)}{Time\,in\,Seconds}$$

Magnetron type:

Quantity of Water [ml]	Starting Temperature [°C]	Final Temperature [°C]	Elapsed Time
1000	**10**	**20.5**	**47**

$$Power(W) = \frac{4.2 * 1000 * 10.5}{47}$$

Power (W) = 938W

8. TEST DATA

8.1. Radiated emissions (Section 18.305)

Magnetron type: RM228, RF Power Output: 938 W

Test distance: 3m

Freq. (MHz)	Pol.	Reading at 3m (dBuV)	CF-AG (dB/m)	F/S at 3m (dBuV/m)	K-Factor	F/S at 300m (uV/m)	Limit at 300m
104,9	V	44,3	12	56,3	0.01	6,5	34,2
111,2	H	55,2	13	68,2	0.01	25,7	34,2
1126	H	41,2	12	53,2	0.01	4,6	34,2
1462	H	52,8	14	66,8	0.01	21,9	34,2
2551	H	55,7	14	69,7	0.01	30,5	34,2
3431	H	49,9	14	63,9	0.01	15,7	34,2
4904	H	51,2	14	65,2	0.01	18,2	34,2
7355	H	54,2	13	67,2	0.01	22,9	34,2
9825	H	49,2	18	67,2	0.01	22,9	34,2
10296	H	48,5	20	68,5	0.01	26,6	34,2
13004	H	46,3	16	62,3	0.01	13,0	34,2
14646	H	47,6	15	62,6	0.01	13,5	34,2
17106	H	31,5	28	59,5	0.01	9,4	34,2

Result: Positive

Limit (at 300m) = $25 * \sqrt{\frac{RF - power}{500}}$ (µV/m)

- Field Strength (at 300m) (uV/m) = K * 10 [Fieldstrength at 3m(dBµV/m)/20]

NOTES:
1. Two representative modes (Full power and defrost) of operation were investigated.

2. A glass beaker was used as the container and the test was made with a shelf in its initial normal position.

3. Load for measurement of radiation on second and third harmonic: Two loads, one of 700 and the other of 300 ml, of water were used. Each load was tested both with the beaker located in the center of the oven and with it in the corner.

4. Load for all other measurements: 700ml of water, with the beaker located in the center of the oven

5. All other emissions are non-significant.

6. AF = Antenna Factor CF = Conversion Factor F/S = Field Strength

7. The tests were made with average detector for frequency range of 30 MHz to 18 GHz.

8.2. Frequency measurements

The operating frequency range of the magnetron has been measured with 2,444MHz to 2,487MHz and is within the ISM frequency 2,450MHz +/-50MHz

CONCLUSIONS:

From the measurement data obtained, the tested sample was considered to have **COMPLIED** with the requirements for the relevant clauses of Federal Communications Commission Rules for Microwave ovens (Part 18)

effected by:

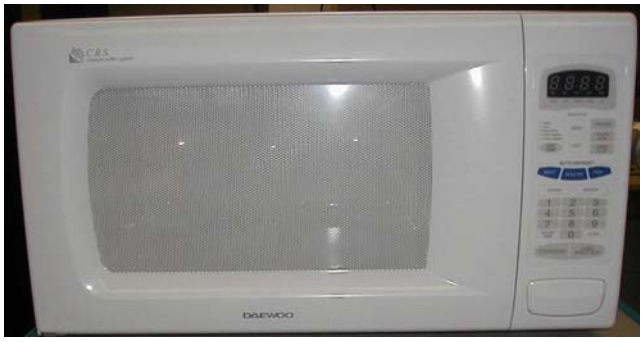
electronic GmbH
Ohmstrasse 1
D-84160 Frontenhausen
Tel.: 08732 - 6381
Fax: 08732 - 2345
E-mail: pkm.accredited-labs@t-online.de

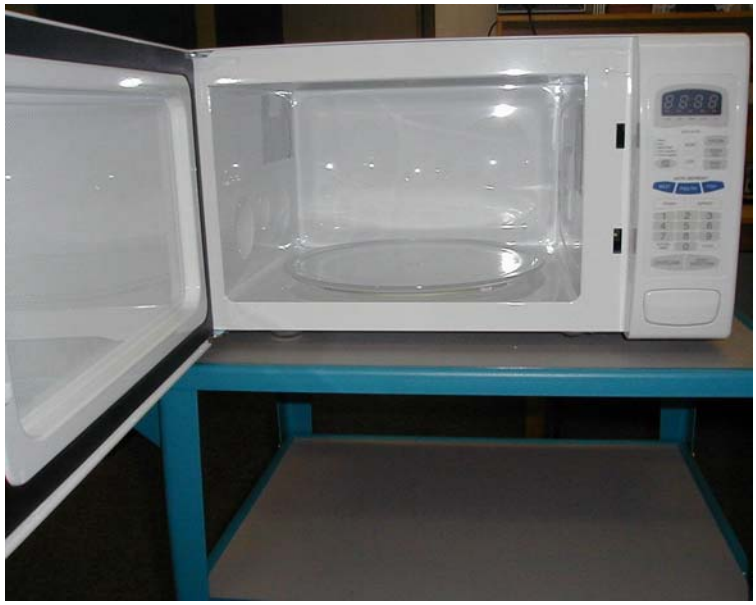
January 21, 2003	G. Raithel Dipl.-Ing. (FH)	
(Datum/*date*)	**(Name/*name*)**	**(Unterschrift/*signature*)**

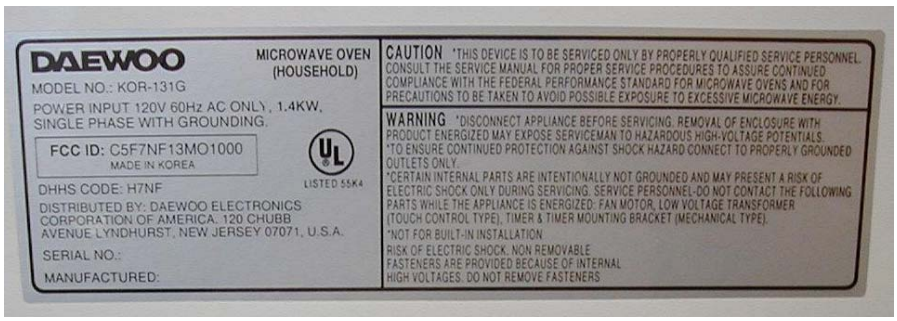
9. List of instrument used

Interference Radiation 30MHz - 1000MHz	EMI test receiver	ESVS-30	Rohde&Schwarz	10572
	EMI test antenna	CBL6111	Chase	10022
	Antenna mast system	AM9104	Schwarzbeck	10099
	RF-cable	K4	Suhner	20707
	AC-Linefilter	FV2-10-D	Timonta	10755
	Turntable	DT 310	Deisel	10774
Interference Radiation 1000MHz – 18GHz	Spectrum Analyzer (100Hz – 26.5GHz)	FSMS 26	Rohde & Schwarz	10965
	Horn antenna (1GHz – 18GHz)	RGA-60	Electro Metrics	10018
	Antenna mast system	AM9104	Schwarzbeck	10099
	RF-cable	K4	Suhner	20707
	AC-Linefilter	FV2-10-D	Timonta	10755
	Turntable	DT 310	Deisel	10774
Frequency measurements	Spectrum Analyzer (100Hz – 26.5GHz)	FSMS 26	Rohde & Schwarz	10965
	Antenna mast system	AM9104	Schwarzbeck	10099
	RF-cable	K4	Suhner	20707
	AC-Linefilter	FV2-10-D	Timonta	10755
	Turntable	DT 310	Deisel	10774

Appendix A






DAEWOO
MICROWAVE OVEN
(HOUSEHOLD)
MODEL NO.: KOR-131G
POWER INPUT 120V 60Hz AC ONLY, 1.4KW,
SINGLE PHASE WITH GROUNDING.
FCC ID: C5F7NF13MO1000
MADE IN KOREA
LISTED 55K4
DHHS CODE: H7NF
DISTRIBUTED BY: DAEWOO ELECTRONICS
CORPORATION OF AMERICA. 120 CHUBB
AVENUE LYNDHURST, NEW JERSEY 07071, U.S.A.
SERIAL NO.:
MANUFACTURED:
CAUTION *THIS DEVICE IS TO BE SERVICED ONLY BY PROPERLY QUALIFIED SERVICE PERSONNEL. CONSULT THE SERVICE MANUAL FOR PROPER SERVICE PROCEDURES TO ASSURE CONTINUED COMPLIANCE WITH THE FEDERAL PERFORMANCE STANDARD FOR MICROWAVE OVENS AND FOR PRECAUTIONS TO BE TAKEN TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY.
WARNING *DISCONNECT APPLIANCE BEFORE SERVICING. REMOVAL OF ENCLOSURE WITH PRODUCT ENERGIZED MAY EXPOSE SERVICEMAN TO HAZARDOUS HIGH-VOLTAGE POTENTIALS.
*TO ENSURE CONTINUED PROTECTION AGAINST SHOCK HAZARD CONNECT TO PROPERLY GROUNDED OUTLETS ONLY.
*CERTAIN INTERNAL PARTS ARE INTENTIONALLY NOT GROUNDED AND MAY PRESENT A RISK OF ELECTRIC SHOCK ONLY DURING SERVICING. SERVICE PERSONNEL-DO NOT CONTACT THE FOLLOWING PARTS WHILE THE APPLIANCE IS ENERGIZED: FAN MOTOR, LOW VOLTAGE TRANSFORMER (TOUCH CONTROL TYPE), TIMER & TIMER MOUNTING BRACKET (MECHANICAL TYPE).
*NOT FOR BUILT-IN INSTALLATION
RISK OF ELECTRIC SHOCK. NON REMOVABLE FASTENERS ARE PROVIDED BECAUSE OF INTERNAL HIGH VOLTAGES. DO NOT REMOVE FASTENERS