



# Nemko Korea Co., Ltd.

300-2, Osan-Ri, Mohyun-Myun, Yongin-City, Kyungki-Do, KOREA

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Applicant:

**Daewoo Electronics Corporation.** Dates of Issue: May 09, 2005 M/W Oven Div. R&D Center, 412-2,

Chungchun-Dong, Bupyong-Gu, Incheon,

403-032, Korea

Attn: Mr. Gun-Woo, Ro

Test Report No.: NK2FE237

Test Site: Nemko Korea Co., Ltd.

EMC site, Korea

FCC ID

**Brand Name** 

**Contact Person** 

C5F7NF1AMO110N

DAEWOO

**Daewoo Electronics Corporation.** M/W Oven Div. R&D Center, 412-2, Chungchun-Dong, Bupyong-Gu, Incheon, 403-032, Korea Mr. Gun-Woo, Ro Telephone No.: +82 32 510 7923

Applied Standard: Part 18 & 2

Classification: Consumer ISM equipment

**EUT Type:** Microwave oven

The device bearing the brand name and FCC ID specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in MP-5:1986.

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested By : S. H. Baek

Bulk sungblun

**Engineer** 

Reviewed By: H.H. Kim Manager & Chief Engineer

Daewoo Electronics Corporation. FCC ID:C5F7NF1AMO110N



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## **SCOPE**

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission under FCC part 18.

**Responsible Party:** Daewoo Electronics Corporation.

**Contact Person :** Mr. Gun-Woo. Ro

Tel No.: +82 32 510 7923

Manufacturer: Daewoo Electronics Corporation.

M/W Oven Div. R&D Center, 412-2, Chungchun-Dong,

Bupyong-Gu, Incheon, 403-032, Korea

**Factory:** 1) Daewoo Microwave Oven Co., Ltd.

981-1, Jangduck-Dong, Gwangsan-Gu, Kwangju-Shi,

506-251, Korea

2) Daewoo Electronics Corporation.

Detda, Dagang District, Tianjin, Chaina

FCC ID: C5F7NF1AMO110N

Model: KOR-1A5ABrand Name: DAEWOO

EUT Type: Microwave Oven

Applied Standard: FCC Part 18 & Part 2

Test Procedure(s): MP-5:1986

• Dates of Test: Aril 23, 2005 to April 29,2005

Place of Tests: Nemko Korea Co., Ltd. EMC Site

Test Report No.: NK2FE237

## **EUT Information**

| Electric Rating:    | 120V, 60Hz AC only, 1.5kW        |
|---------------------|----------------------------------|
| Clock:              | 4MHz                             |
| Magnetron Type:     | RM269 / Daewoo Electronics Corp. |
| Operating Frequency | 2.45GHz                          |
| Rated Output Power  | 1100W                            |



## **INTRODUCTION**

The measurement procedure described in MP5:1986 for Methods of Measurement of radiated, powerline conducted radio noise, frequency and power output was used in determining emissions emanating from **Daewoo Electronics Corporation**.

FCC ID: C5F7NF1AMO110N, Microwave Oven.

These measurement tests were conducted at Nemko Korea Co., Ltd. EMC Laboratory .

The site address is 300-2, Osan-Ri, Mohyun-Myun, Yongin-City, Kyungki-Do, KOREA The area of Nemko Korea Corporation Ltd. EMC Test Site is located in a mountain area at 80 kilometers (48 miles) southeast and Incheon International Airport (Incheon Airport), 30 kilometers (18miles) south-southeast from central Seoul.

It is located in the valley surrounded by mountains in all directions where ambient radio signal conditions are quiet and a favorable area to measure the radio frequency interference on open field test site for the computing and ISM devices manufactures.

The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003

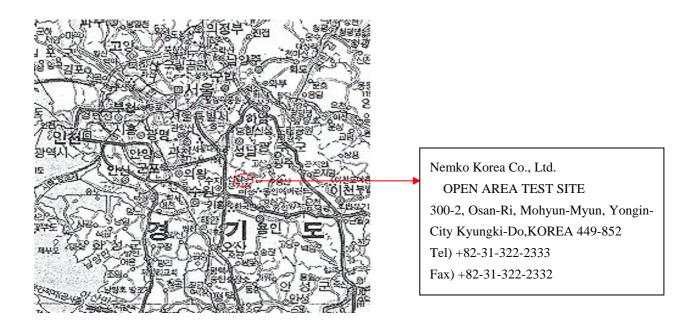


Fig. 1. The map above shows the Seoul in Korea vicinity area.

The map also shows Nemko Korea Corporation Ltd. EMC Lab and Incheon Airport.



# **DESCRIPTION OF TESTS**

## **Radiation Hazard**

A 700-ml water load was placed in the center of the oven.

The power setting was set to maximum power.

While the oven was operating, the Microwave Survey Meter probe was moved slowly around the door seams to check for leakage.

## **Input Power Measurement**

The EUT was placed on a wooden table 0.8m at 1m distance Horn antenna.

A 700ml water load was placed in the center of the oven and the oven set to maximum power. A 700ml water load was chosen for its compatibility.

Input power and current were measured using a Power Analyzer.

Manufacturers to determine their input ratings commonly use this procedure.

## **Output Power Measurement**

The Caloric Method was used to determine maximum output power.

The initial temperature of a 1000ml water load was measured. The water load was placed in the center of the oven. The oven was operated at maximum output power for 120 seconds. Then the temperature of the water re-measured.

#### **Frequency measurements**

Following the above test, after operating the oven long enough to assure that stable operating temperature were obtained, the operating frequency was monitored as the input voltage was varied between 80 to 125 percent of the nominal rating. The water load was tested at 1000, 800, 600, 400, 200ml for the load varied.



## **DESCRIPTION OF TESTS**

## **Conducted Emissions**

The Line conducted emission test facility is located inside a 4 X 7 X 2.5 meter shielded enclosure.

It is manufactured by EM engineering. The shielding effectiveness of the shielded room is in accordance with MIL-STD-285 or NSA 65-6.

A 1m X 1.5m wooden table 0.4m height is placed 0.4m away from the vertical wall and 1.5m away from the side of wall of the shielded room

Kyoritsu (KNW-407) of the 50ohm/50uH Line Impedance Stabilization Network(LISN) is bonded to the shielded room.

The EUT is powered from the Kyoritsu LISN.

Power to the LISN is filtered by high-current high insertion loss Power line filters.

The purpose of filter is to attenuate ambient signal interference and this filter is also bonded to shielded enclosure.

All electrical cables are shielded by tinned copper zipper tubing with inner diameter of 1/2".

If DC power device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the LISN,

All interconnecting cables more than 1 meter were shortened by non inductive bundling (serpentine fashion) to a 1 meter length.

Sufficient time for EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 150kHz to 30MHz with 20msec sweep time.

The frequency producing the maximum level was re-examined using the EMI test receiver. (Rohde & Schwarz ESCS30).

The detector function were set to CISPR quasi-peak mode & average mode.

The bandwidth of receiver was set to 9KHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.

Each EME reported was calibrated using the R&S signal generator.

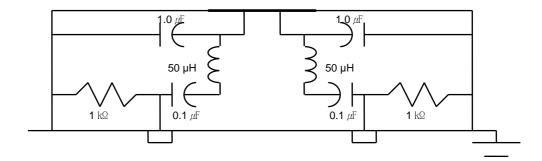


Fig. 2. LISN Schematic Diagram



## DESCRIPTION OF TESTS

### **Radiated Emissions**

Preliminary measurement were made indoors at 3 meter using broad band antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The Technology configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna was note for each frequency found. The spectrum was scanned from 30 to 1000MHz using Biconical log Antenna(ARA, LPB-2520/A). Above 1GHz, Doppels Teg Horn antenna (EMCO, DAA-37121) was used. Final Measurements were made outdoors at 10m using Biconical log Antenna (Schwarzbeck, VULB 9166) for measurement from 30MHz to 1000MHz and made indoors at 3m using Doppels Teg Horn antenna (EMCO, DAA-37121) for measurement from 1GHz to 24GHz.

Each frequency found during pre-scan measurements was reexamined and investigated using EMI test receiver. (ESCS30)

The detector function were set to CISPR quasi-peak and peak mode and the bandwidth of the receiver were set to 120KHz and 1MHz depending on the frequency or type of signal. The half wave dipole antenna was tuned to the frequency found during preliminary radiated measurements.

The EUT support equipment and interconnecting cables were re configured to the setup producing the maximum emission for the frequency and were placed on top of a 0.8m high non- metallic 1.0X 1.5 meter table.

The EUT, support equipment and interconnecting cables were re-arranged and manipulated to maximize each EME emission.

The EUT is rotated about its vertical axis on the turntable, and the polarization and height of the receiving antenna are varied to obtain the highest field strength on the particular frequency under observation.

Each EME reported was calibrated using the R/S signal generator.

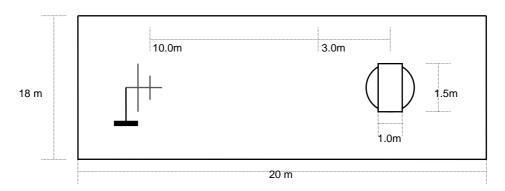


Fig. 3. Dimensions of Outdoor Test Site



## **Radiation Hazard**

| Probe Location | Maximum Leakage<br>[mW/Cm2] | Limit<br>[mW/Cm2] |
|----------------|-----------------------------|-------------------|
| Α              | 0.09                        | 1.00              |
| В              | 0.03                        | 1.00              |
| С              | 0.02                        | 1.00              |
| D              | 0.02                        | 1.00              |
| All others     | 0.01                        | 1.00              |

## **Input Power Measurement**

| Operation mode | P rated (W) | P (W) | dP (%) | Required dP (%) |  |
|----------------|-------------|-------|--------|-----------------|--|
| Power Input    | 1500        | 1500  | 0      | +5%or-10%       |  |

# **RF Output Power Measurement**

| Quantity of | Starting     | Final        | Elapsed Time | RF Power |
|-------------|--------------|--------------|--------------|----------|
| Water       | Temperature  | Temperature  | [seconds]    | [watts]  |
| [ml]        | [Centigrade] | [Centigrade] | [Seconds]    | [watts]  |
| 1000        | 10.1         | 37.4         | 120          | 953      |

RF Power = (4.187 Joules/Cal) x (Volume in ml) x (Temp. Rise)
Time in seconds

Tested by : S. H. Baek

Bulk sung blun



## **Operating Frequency measurements**

#### ▶ Frequency vs Line Voltage Variation Test

| [ | Room | Tem | perature | : | 22.5 | C] |
|---|------|-----|----------|---|------|----|
|---|------|-----|----------|---|------|----|

| Line Voltage<br>Variation (Vac) | *)Pole | Frequency<br>[MHz] | Allowed Tolerance for the ISM Band |
|---------------------------------|--------|--------------------|------------------------------------|
|                                 | Н      | Lower : 2410       |                                    |
| 00 (000()                       | Н      | Upper : 2452       |                                    |
| 96 (80%)                        | V      | Lower : 2401       |                                    |
|                                 | V      | Upper : 2453       |                                    |
|                                 | Н      | Lower : 2424       |                                    |
| 409 (009/)                      | Н      | Upper : 2453       |                                    |
| 108 (90%)                       | V      | Lower : 2403       |                                    |
|                                 | V      | Upper : 2453       | Lower : 2400MHz                    |
|                                 | Н      | Lower : 2429       | Upper : 2500MHz                    |
| 422 (4400/)                     | Н      | Upper : 2454       |                                    |
| 132 (110%)                      | V      | Lower : 2420       |                                    |
|                                 | V      | Upper : 2454       |                                    |
|                                 | Н      | Lower : 2424       |                                    |
| 450 (4050/)                     | Н      | Upper : 2472       |                                    |
| 150 (125%)                      | V      | Lower : 2429       |                                    |
|                                 | V      | Upper : 2472       |                                    |

#### NOTE:

\*Pol. H =Horizontal V=Vertical
 Initial load : 1000ml of water in the beaker.
 Line voltage varied from 96Vac to 150Vac.

4. ISM Frequency : 2450MHz, Tolerance :  $\pm$ 50MHz

RESULT: Pass

Tested by : S. H. Baek

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#### ▶ Frequency vs Load Variation Test

[ Room Temperature : 22.0℃]

|                 |        | 1            |                       |
|-----------------|--------|--------------|-----------------------|
| Volume of water | *)Pole | Frequency    | Allowed Tolerance for |
| (cc)            | )i oic | [MHz]        | the ISM Band          |
|                 | Н      | Lower : 2408 |                       |
| 1000            | Н      | Upper : 2465 |                       |
| 1000            | V      | Lower : 2413 |                       |
|                 | V      | Upper : 2460 |                       |
|                 | Н      | Lower : 2402 |                       |
| 800             | Н      | Upper : 2465 |                       |
| 000             | V      | Lower : 2411 |                       |
|                 | V      | Upper : 2462 |                       |
|                 | Н      | Lower : 2408 |                       |
| 600             | Н      | Upper : 2456 | Lower : 2400MHz       |
| 600             | V      | Lower : 2404 | Upper : 2500MHz       |
|                 | V      | Upper : 2461 |                       |
|                 | Н      | Lower : 2420 |                       |
| 400             | Н      | Upper : 2451 |                       |
| 400             | V      | Lower : 2420 |                       |
|                 | V      | Upper : 2450 |                       |
|                 | н      | Lower : 2433 |                       |
| 200             | н      | Upper : 2461 |                       |
| 200             | V      | Lower : 2427 |                       |
|                 | V      | Upper : 2460 |                       |

#### **NOTE:**

1. \*Pol. H =Horizontal V=Vertical
2. Initial load : 1000ml of water in the beaker.

2. Initial load . 1000iiii of water in the beaker.

3. Frequency was measured by using nominal voltage (AC120V).

4. ISM Frequency : 2450MHz, Tolerance :  $\pm$ 50MHz

RESULT: Pass

Tested by : S. H. Baek

Back sung blun



## **Conducted Emissions**

FCC ID: C5F7NF1AMO110N

[ Room Temperature : 23.0 ℃]

| Frequency | Level(dB <i>µ</i> ∛) |         | Line | Limit(dB <i>µ</i> V) |         | Margin(dB) |         |
|-----------|----------------------|---------|------|----------------------|---------|------------|---------|
| (MHz)     | Q-Peak               | Average |      | Q-Peak               | Average | Q-Peak     | Average |
| 0.15      | 44.4                 | 21.2    | N    | 66.0                 | 56.0    | 21.6       | 34.8    |
| 0.22      | 30.5                 | 7.8     | N    | 62.8                 | 52.8    | 32.3       | 45.0    |
| 0.23      | 37.9                 | 14.5    | L    | 62.4                 | 52.4    | 24.5       | 37.9    |
| 0.25      | 37.2                 | 13.2    | L    | 61.8                 | 51.8    | 24.6       | 38.6    |
| 0.34      | 37.4                 | 13.4    | L    | 59.2                 | 49.2    | 21.8       | 35.8    |
| 0.45      | 33.0                 | 7.4     | N    | 56.9                 | 46.9    | 23.9       | 39.5    |

<sup>\*)</sup> Correction factor was included to Test Level (dBuV)

#### **NOTES:**

- 1. Measurements using CISPR quasi-peak mode & average mode.
- 2. See attached Plots.
- 3. LINE : L = Line , N = Neutral

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Tested by: S. H. Baek



## **Radiated Emissions**

FCC ID: C5F7NF1AMO110N

| ▶ 30MHz ~ 1GHz | 3 | 30N | lHz | ~ 1 | GHz |
|----------------|---|-----|-----|-----|-----|
|----------------|---|-----|-----|-----|-----|

| ► 30MHz ~ 1GHz [Room Temperature : 23.5 |                 |       |           |                   |                   |        |
|---|-----------------|-------|-----------|-------------------|-------------------|--------|
| Frequency                               | Reading         | Pol*  | AF+CL+Amp | Result(PK)        | Limit(10m)        | Margin |
| (MHz)                                   | (dB <i>µ</i> V) | (H/V) | (dB)**    | (dB <i>μ</i> V/m) | (dB <i>µ</i> V/m) | (dB)   |
| 45.52                                   | 45.9            | V     | -21.3     | 24.6              | 60.76             | 36.2   |
| 68.80                                   | 41.6            | V     | -21.2     | 20.4              | 60.76             | 40.4   |
| 130.88                                  | 37.8            | V     | -15.6     | 22.2              | 60.76             | 38.6   |
| 251.16                                  | 29.6            | V     | -12.5     | 17.1              | 60.76             | 43.7   |
| 252.13                                  | 37.1            | Н     | -12.5     | 24.6              | 60.76             | 36.2   |
| 373.38                                  | 31.7            | V     | -9.4      | 22.3              | 60.76             | 38.5   |
| 381.14                                  | 28.6            | Н     | -9.2      | 19.4              | 60.76             | 41.4   |
| 509.18                                  | 33.9            | Н     | -6.1      | 27.8              | 60.76             | 33.0   |
| 518.88                                  | 33.3            | V     | -5.8      | 27.5              | 60.76             | 33.3   |

#### <Radiated Measurements at 10meters>

#### NOTES:

- 1. \*Pol. H =Horizontal V=Vertical
- 2. \*\*AF+CL+Amp. = Antenna Factor + Cable Loss + Amplifier.
- 3. Distance Correction factor : 20 \* log (300/10) = 30dBuV/m
- 4. The limit at 300meters is 20 \* LOG (25 \* SQRT (RF Power/500))
- 5. All other emissions were measured while a 700ml load was placed in the center of the oven.
- 6. If no frequencies are specified in the tables, no measurement for peak & average was necessary.

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Tested by : S. H. Baek



### **Radiated Emissions**

FCC ID: C5F7NF1AMO110N

► 1GHz ~ 24GHz [Room Temperature : 21.5°]

| Frequency | Reading      | Pol*  | AF+CL+Amp | K       | Limit<br>(with K) | Results           | Margin |
|-----------|--------------|-------|-----------|---------|-------------------|-------------------|--------|
| (MHz)     | (dB $\mu$ V) | (H/V) | (dB)**    | (dB)*** | (dB <i>μ</i> V/m) | (dB <i>µ</i> V/m) | (dB)   |
| 4279.00   | 24.7         | ٧     | 10.30     | 40.17   | 70.93             | 35.00             | 35.93  |
| 4928.00   | 32.4         | ٧     | 10.00     | 40.00   | 70.76             | 42.40             | 28.36  |
| 7332.00   | 34.4         | ٧     | 14.30     | 40.00   | 70.76             | 48.70             | 22.06  |
| 8448.00   | 26.8         | Н     | 16.85     | 40.00   | 70.76             | 43.65             | 27.11  |
| 9805.00   | 29.4         | Н     | 18.00     | 40.00   | 70.76             | 47.40             | 23.36  |
| 1466.00   | 33.2         | ٧     | 25.05     | 40.00   | 70.76             | 58.25             | 12.51  |
| 1713.00   | 30.8         | ٧     | 27.15     | 40.00   | 70.76             | 57.95             | 12.81  |

#### <Radiated Measurements at 3meters>

#### NOTES:

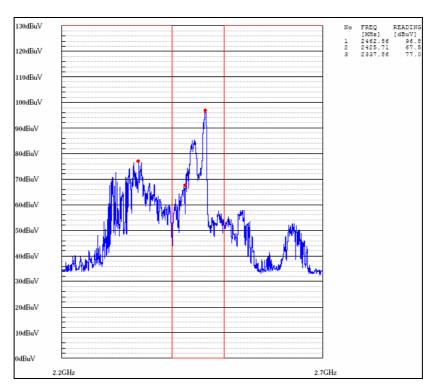
- 1. \*Pol. H =Horizontal V=Vertical
- 2. \*\*AF+CL+Amp. = Antenna Factor + Cable Loss + Amplifier.
- 3. \*\*\*Computations to determine compliance
- 4. Distance Correction factor: 20 \* log (300/3)=40dBuV/m
- 5. The limit at 300meters is 20 \* LOG (25 \* SQRT (RF Power/500))
- 6. Load for measurement of radiation on second and third harmonic: Two loads, one of 700ml and the other of 300ml, 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.
- 7. The test was performed at peak detector mode with RBW 1MHz, VBW 10Hz.
- 8. All other emissions were measured while a 700ml load was placed in the center of the oven.
- 9. If no frequencies are specified in the tables, no measurement for peak with RBW 1MHz & VBW 10Hz.

Tested by: S. H. Baek

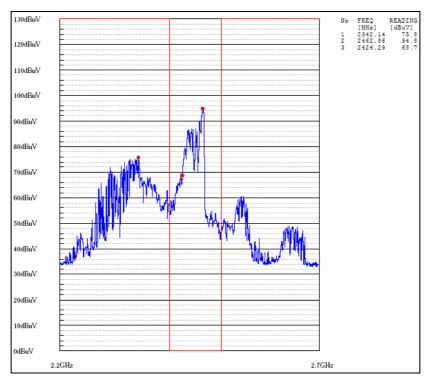
Buck sung bun



## Frequency vs Line Voltage Variation Test



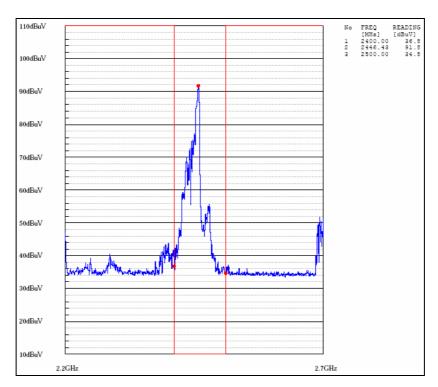
Horizontal (96V, 1000cc)



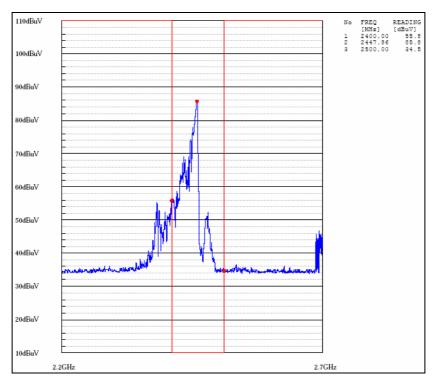
Vertical (96V, 1000cc)



## • Frequency vs Line Voltage Variation Test



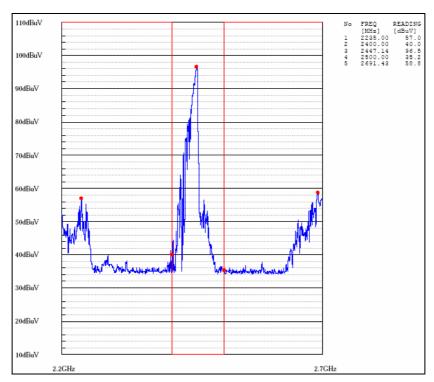
Horizontal (108V, 1000cc)



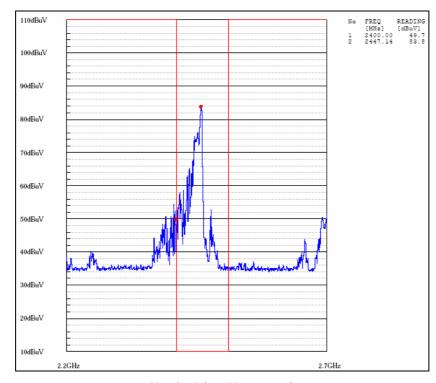
Vertical (108V, 1000cc)



## • Frequency vs Line Voltage Variation Test



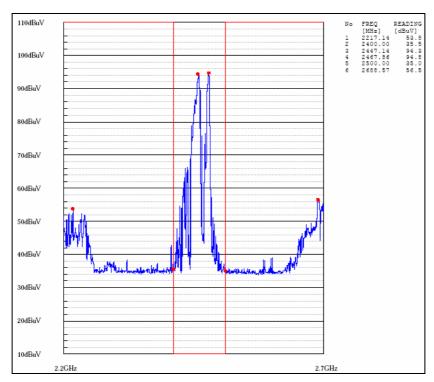
Horizontal (132V, 1000cc)



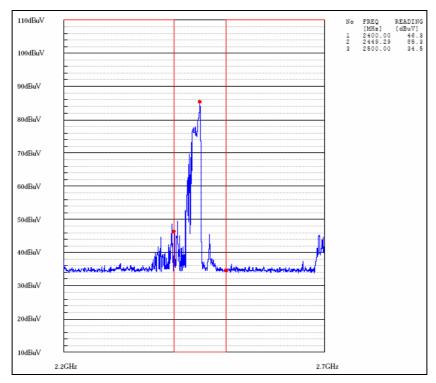
Vertical (132V, 1000cc)



## • Frequency vs Line Voltage Variation Test



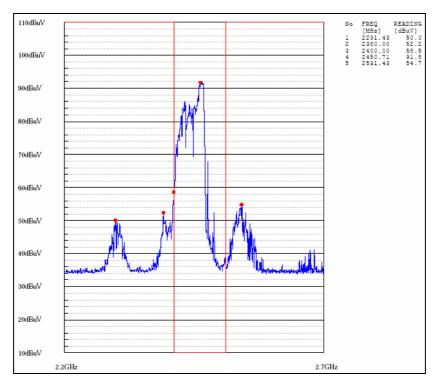
Horizontal (150V, 1000cc)



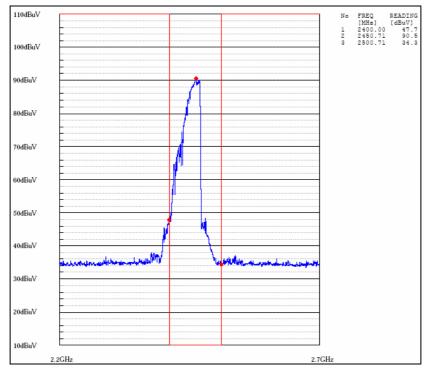
Vertical (150V, 1000cc)



## • Frequency vs Load Variation Test



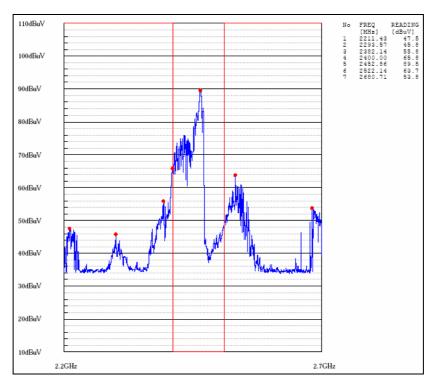
Horizontal (120V, 1000cc)



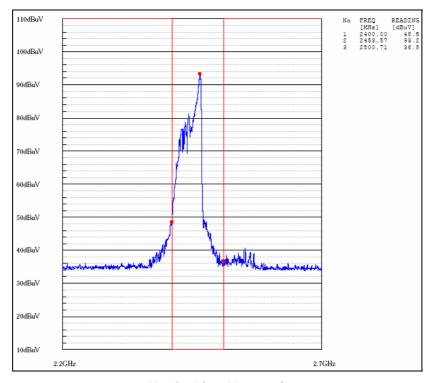
Vertical (120V, 1000cc)



## Frequency vs Load Variation Test



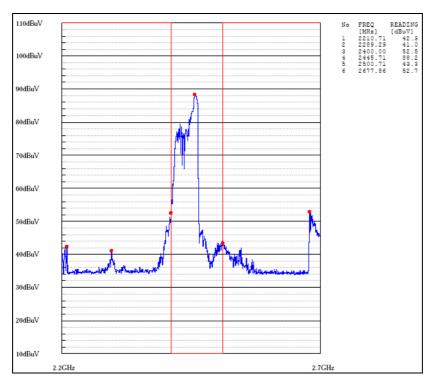
Horizontal (120V, 800cc)



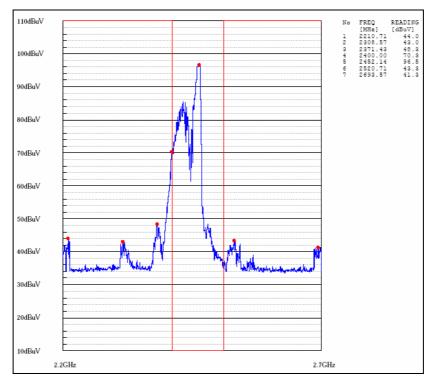
**Vertical (120V, 800cc)** 



## Frequency vs Load Variation Test



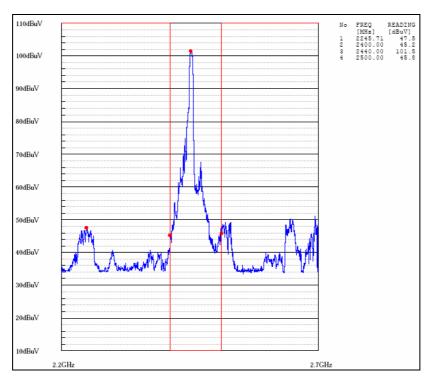
Horizontal (120V, 600cc)



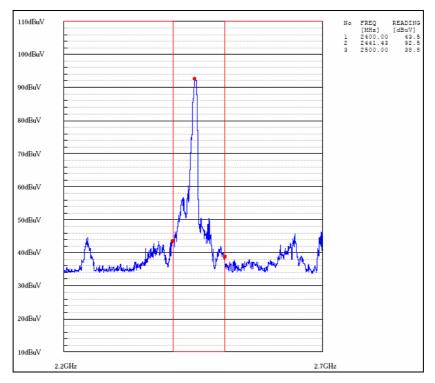
**Vertical (120V, 600cc)** 



## Frequency vs Load Variation Test



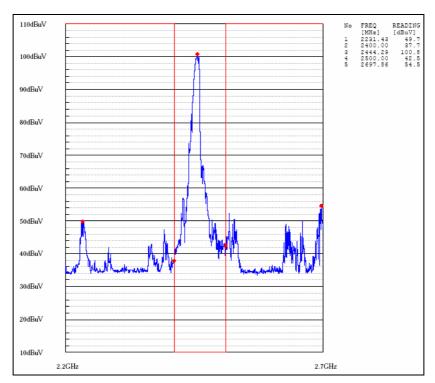
Horizontal (120V, 400cc)



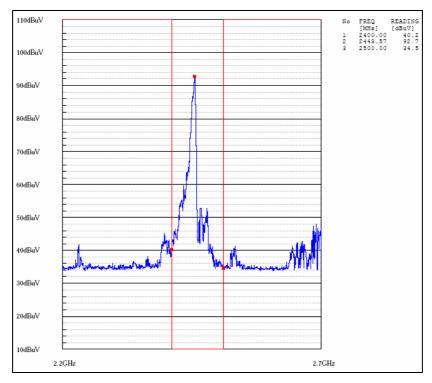
Vertical (120V, 400cc)



## • Frequency vs Load Variation Test



Horizontal (120V, 200cc)

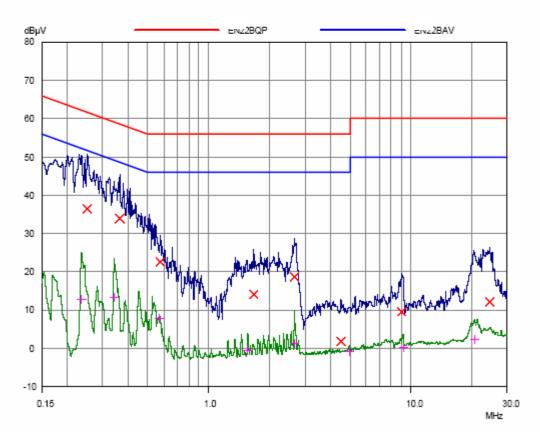


Vertical (120V, 200cc)



#### Conducted Emission at the Mains port (Line)

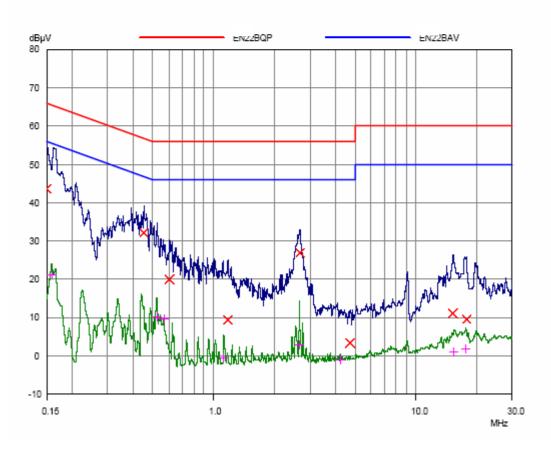
NEMKO KOREA (NK-2E-E-237) 02 May 2005 13:46 Conducted Emissions Microwave Oven EUT: Manuf: Daewoo Electronics Corporation Op Cond: AC 120V , 60Hz Baek Operator: Test Spec: M/N: KOR-1A5A Comment: LINE: LINE Result File: 774-2.dat : New Measurement Scan Settings (1 Range) Frequencies Receiver Settings -Start Stop Step IF BW Preamp OpRge Detector M-Time Atten 150kHz 30MHz 3.9063kHz 9kHz PK+AV 20msec 10 dB OFF 60dB Transducer No Start Name 150kHz 30MHz CE\_LINE X QP / + AV Final Measurement: Detectors: Meas Time: 1sec Subranges: 8 Acc Margin: 60 dB





#### • Conducted Emission at the Mains port (Neutral)

NEMKO KOREA (NK-2E-E-237) 02 May 2005 13:37 Conducted Emissions EUT: Microwave Oven Manuf: Daewoo Electronics Corporation Op Cond: AC 120V, 60Hz Operator: Baek Test Spec: M/N: KOR-1A5A Comment: LINE: NEUTRAL Result File: 774-2.dat : New Measurement Scan Settings (1 Range) Frequencies Receiver Settings -Start IF BW Step Stop Detector M-Time Preamp OpRge Atten 150kHz 30MHz 3.9063kHz PK+AV 20msec 60dB Stop Transducer 150kHz 30MHz CE\_LINE X QP / + AV Final Measurement: Detectors: Meas Time: 1sec Subranges: 8 Acc Margin: 60 dB





# **ACCURACY OF MEASUREMENT**

The Measurement Uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 with the confidence level of 95%

## 1. Radiation Uncertainty Calculation

| Contribution                           | Probability Distribution | Uncertainty(+/-dB) |  |
|--|--------------------------|--------------------|--|
| Antenna Factor                         | Normal (k=2)             | ± 0.5              |  |
| Cable Loss                             | Normal (k=2)             | ± 0.04             |  |
| Receiver Specification                 | Rectangular              | ± 2.0              |  |
| Antenna directivity                    |                          | ± 1.0              |  |
| Antenna Factor variation with Height   |                          |                    |  |
| Antenna Phase Center Variation         | Rectangular              |                    |  |
| Antenna Factor Frequency Interpolation |                          |                    |  |
| Measurement Distance Variation         |                          |                    |  |
| Site Inperfections                     | Rectangular              | ± 2.0              |  |
| Mismatch:Receiver VRC ri=0.3           |                          | + 0.25 / - 0.26    |  |
| Antenna VRC rR=0.1(Bi)0.4(Lp)          | U-Shaped                 |                    |  |
| Uncertainty Limits 20Log(1+/-ri rR)    |                          |                    |  |
| System Repeatibilty                    | Std.deviation            | ± 0.05             |  |
| Repeatability of EUT                   | -                        | -                  |  |
| Combined Standard Uncertainty          | Normal                   | ± 1.77             |  |
| Expended Uncertainty U                 | Normal (k=2)             | ± 3.5              |  |

## 2. Conducted Uncertainty Calculation

| Contribution                        | Probability Distribution | Uncertainty(+/-dB) |
|-------------------------------------|--------------------------|--------------------|
| Receiver Specification              | Normal (k=2)             | ± 2.0              |
| LISN coupling spec.                 | Normal (k=2)             | ± 0.4              |
| Cable and input attenuator cal.     | Rectangular              | ± 0.4              |
| Mismatch:Receiver VRC ri=0.3        |                          |                    |
| LISN vrc rg=0.1                     | U-Shaped                 | $\pm 0.26$         |
| Uncertainty Limits 20Log(1+/-ri rR) |                          |                    |
| System Repeatibilty                 | Std.deviation            | ± 0.68             |
| Repeatability of EUT                | -                        | -                  |
| Combined Standard Uncertainty       | Normal                   | ± 1.18             |
| Expended Uncertainty U              | Normal (k=2)             | ± 2.4              |



# LIST OF TEST EQUIPMENT

| No. | Instrument              | Manufacturer              | Model      | <b>Calibration Date</b> |
|-----|-------------------------|---------------------------|------------|-------------------------|
| 1   | *Test Receiver          | R & S                     | ESCS 30    | 2004.08                 |
| 2   | *Test Receiver          | R & S                     | ESCS 30    | 2004.12                 |
| 3   | Amplifier               | НР                        | 8447F      | 2004.07                 |
| 4   | *Amplifier              | НР                        | 8447F      | 2005.01                 |
| 5   | Amplifier               | НР                        | 8447F      | 2004.10                 |
| 6   | *Amplifier              | НР                        | 8449B      | 2005.03                 |
| 7   | *Spectrum Analyzer      | НР                        | 8566B      | 2005.03                 |
| 8   | Spectrum Analyzer       | НР                        | 8568B      | 2004.10                 |
| 9   | *Spectrum Analyzer      | Anritsu                   | MS2668C    | 2004.12                 |
| 10  | *Logbicon Super Antenna | Schwarzbeck               | VULB9166   | 2004.05                 |
| 11  | *Doppels Teg Horn       | EMCO                      | DAA-37121  | 2004.10                 |
| 12  | *Biconical Log Antenna  | ARA                       | LPB-2520/A | 2005.01                 |
| 13  | High Voltage Probe      | R & S                     | ESH2-Z3    | 2004.06                 |
| 14  | *Microwave Survey Meter | <b>Holaday Industries</b> | H1-1801    | 2004.07                 |
| 15  | Signal Generater        | R & S                     | SMP02      | 2005.03                 |
| 16  | *LISN                   | R & S                     | ESH3-Z5    | 2004.10                 |
| 17  | *LISN                   | Kyoritsu                  | KNW-407    | 2005.03                 |
| 18  | LISN                    | Kyoritsu                  | KNW-408    | 2004.12                 |
| 19  | *Position Controller    | EM Eng.                   | N/A        | N/A                     |
| 20  | *Turn Table             | EM Eng.                   | N/A        | N/A                     |
| 21  | *Antenna Mast           | EM Eng.                   | N/A        | N/A                     |
| 22  | *Anechoic Chamber       | EM Eng.                   | N/A        | N/A                     |
| 23  | *Shielded Room          | EM Eng.                   | N/A        | N/A                     |
| 24  | *Position Controller    | Seo-Young EMC             | N/A        | N/A                     |
| 25  | *Turn Table             | Seo-Young EMC             | N/A        | N/A                     |
| 26  | *Antenna Mast           | Seo-Young EMC             | N/A        | N/A                     |
| 27  | *Anechoic Chamber       | Seo-Young EMC             | N/A        | N/A                     |
| 28  | *Shielded Room          | Seo-Young EMC             | N/A        | N/A                     |

<sup>\*)</sup> Test equipment used during the test



# APPENDIX D - SCHEMATIC DIAGRAM



# APPENDIX E - USER'S MANUAL



# APPENDIX F - BLOCK DIAGRAM