



## EMISSION TEST REPORT

Test report file No. : **03-IST-070/FA** Date of issue : Mar. 20, 2003.

Model / Type No. : DSP-4280GM ☐ Basic ☒ Alternate

Kind of product : PDP(Plasma Display Panel)

Brand name : DAEWOO

Applicant : Daewoo Electronics Corp.

Manufacturer : Daewoo Electronics Corp.

Address : 543, Dangjung-Dong, Kunpo-City, Kyunggi-Do, Korea.

**Test result** according to the regulation(s)

☒ Positive ☐ Negative

at page 3.

This test report without appendix consists of 24 pages.

It is not allowed to copy this report even partly without the allowance of the Test Laboratory.

This equipment is complied with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-1992.

## DIRECTORY

| <b>A) Documentation.</b>    | Page                            |
|-----------------------------|---------------------------------|
| Directory                   | <u>2</u>                        |
| Test regulations            | <u>3</u>                        |
| Environmental Conditions    | <u>3</u>                        |
| Test Conditions             | <u>4~5</u>                      |
| Equipment under Test        | <u>6</u>                        |
| Description of Difference   | <u>7</u>                        |
| Test Result                 | <u>8</u>                        |
| Test-setups (Photos )       | <u>9~12</u>                     |
| Test-setup (Figures)        | <u>13</u>                       |
| Summary                     | <u>24</u>                       |
| <br>                        |                                 |
| <b>B) Test Data.</b>        |                                 |
| Conducted emissions (Mains) | : 450 kHz - 30 MHz <u>14~19</u> |
| Radiated emissions          | : 30 MHz – 1 GHz <u>20~23</u>   |
| <br>                        |                                 |
| <b>C) Appendix</b>          |                                 |

## **TEST REGULATIONS**

The tests were performed according to the following regulations ;

- 
- - FCC Part 15, Subpart B (Unintentional Radiators, Class B)

## **Information of Test Laboratory**

### **IST EMC Lab.**

San 21-8 Goan-Ri, Baekam-Myun, Yongin-Si, Kyunggi-Do, Korea  
International - Tel : 82-31 - 333 - 4093. Fax : 82-31 - 333 - 4094.  
Domestic - Tel : 031 - 333 - 4093. Fax : 031 - 333 - 4094.

## **ENVIRONMENTAL CONDITIONS**

|                      |                  |
|----------------------|------------------|
| Temperature          | <u>12</u>        |
| Humidity             | <u>36</u> %      |
| Atmospheric pressure | <u>1014</u> mbar |

## TEST CONDITIONS

The **measurement of the conducted emissions (Interference voltage)** was performed in a shielded room.

### Test location :

☒ Shielded room. No.1

☐ Compact chamber 2

### Used testing instruments :

| Name     | Type          | Manufacturer    | Calibration. Date | Serial Number |
|----------|---------------|-----------------|-------------------|---------------|
| ESH 3    | Test Receiver | Rohde & Schwarz | Jul. 25, 2002     | 892108/018    |
| 3725/2   | LISN          | EMCO            | Aug. 22, 2002     | 9101-2068     |
| KNW-407  | LISN          | Hyup-Rip        | Aug. 21, 2002     | 8-883-10      |
| ESH 3-Z2 | Pulse Limiter | Rohde & Schwarz | Jul. 25, 2002     | 357.8810.52   |

### Test - accessories :

| Type              | Manufacturer |
|-------------------|--------------|
| Aneroid Barometer | Sato         |
| Hygrometer        | Sato         |

### Measurement Procedures :

Conducted emissions measurements were made in accordance with ANSI C-63.4-1992, "Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The measurement were performed over the frequency range of 0.45MHz to 30MHz using a 50Ω/50uH LISN as the input transducer to an EMI/Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within an IF bandwidth of 10kHz or for "quasi-peak" within a bandwidth of 9kHz.

All used test-instruments as well as the test-accessories are calibrated regularly.

### Test engineer :



S. H. Lee / Test Engineer  
IST EMC Lab.

The **measurement of the radiated emissions (Electric field)** in the frequency range from 30 MHz to 1GHz was performed in horizontal and vertical antenna polarization at a open-site which meet the site attenuation requirement of ANSI C63.4-1992 and a test distance of :

Location : ☒ Open Site No. 1 ☐ Open Site No. 2 ☐ Open Site No. 3  
 Distance : ☒ 3 meters ☐ 10 meters

**Used testing instruments :**

| Name      | Type          | Manufacturer    | Calibration. Date | Serial Number |
|-----------|---------------|-----------------|-------------------|---------------|
| ESVP      | Test Receiver | Rohde & Schwarz | Aug. 16, 2002     | 861744/004    |
| VULB 9160 | Antenna       | Schwarzbeck     | Jul. 10, 2002     | 3048          |

**Test - accessories :**

| Type              | Manufacturer |
|-------------------|--------------|
| Aneroid Barometer | Sato         |
| Hygrometer        | Sato         |

**Measurement procedures**

Radiated measurements were in accordance with ANSI C63.4-1992 "Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz". The measurements were performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a EMI/Field Intensity Meter. The measurements were made with the detector set for "quasi-peak" within a bandwidth of 120kHz.

All used test-instruments as well as the test-accessories are calibrated regularly.

**Test engineer :**



S. H. Lee / Test Engineer  
IST EMC Lab.

## EQUIPMENT UNDER TEST

### Equipment Description

The Equipment Under Test (EUT) is the **PDP of Daewoo Electronics Corp.**

|                    |                                                                                     |
|--------------------|-------------------------------------------------------------------------------------|
| Outer dimensions   | Without Stand : WxHxD=1,055 x 652 x 85 mm<br>With Stand : WxHxD=1,055 x 730 x 85 mm |
| Weight             | Without Stand - 41 Kg, With Stand - 47 Kg                                           |
| Power requirements | 100 ~ 240 Vac, 50/60Hz, 3.2 ~ 1.3A                                                  |
| Rated input power  | 320W                                                                                |
| External port      | PC IN(2), Component(2), Video IN(2), Speaker Out(2)                                 |
| Product            | PDP(Plasma Display Panel)                                                           |

### EUT Type :

- ☒ Table-Top.  
☐ Floor-Standing.  
☐ Table-Top and Floor-Standing(Combination).

### Operation – mode of the E.U.T. :

The equipment under test was operated during the measurement under following conditions :

- ☐ Standby.  
☒ Operational Condition : - Test program under Windows 98 : Scrolling “H” pattern,  
 1600 X 1200, 75Hz  
 - Color bar and activating speaker

### Configuration of the equipment under test :

Following peripheral devices and interface cables were connected during the measurement :

| Equipment     | Type           | Brand            | Serial No   |
|---------------|----------------|------------------|-------------|
| PC            | Brio BA600/550 | HP               | SG01901756  |
| Keyboard      | SK-2502C       | HP               | M004103042  |
| Mouse(PS/2)   | M-S48a         | HP               | LZE01252490 |
| Mouse(Serial) | M-M28          | Logitech         | LCA53305547 |
| Printer       | A0302384       | Northern Telecom | 26633S60168 |

#### Connecting Interface Cables & Ports :

- Shielded monitor's signal cable : 2.8m
- S-Video Cable: 1.0m(75Ω, 620Ω Termination)
- RCA Cables: 75Ω(Video IN), 47kΩ(Audio IN) Termination
- Unshielded Speaker cable : 2.5m

## **Description of Difference**

(Difference Between Original and Changed DSP-4280GM)

Difference between the original model and the changed model

| Item         | The original model          |            | The changed model           |            | Remark                          |
|--------------|-----------------------------|------------|-----------------------------|------------|---------------------------------|
|              | Manufacturer                | Type       | Manufacturer                | Type       |                                 |
| Noise filter | DELTA<br>Electronics Inc.   | 10DKDW3S   | DELTA<br>Electronics Inc.   | 10GEEW3Q   | -                               |
| 5V-SUB PCB   | None                        | None       | DAEWOO<br>Electronics Corp. | PTSBMSG009 | adding                          |
| POWER PCB    | SM TECH                     | SP-3000    | ORIGIN Electric<br>Co.,Ltd. | PDD-421    | -                               |
| VIDEO PCB    | DAEWOO<br>Electronics Corp. | PEVDMSD035 | DAEWOO<br>Electronics Corp. | PEVDMSD035 | Changed to<br>LVDS<br>Interface |
| PDP Module   | ORION PDP<br>Co.,Ltd.       | PW4210     | NEC Corp.                   | NP42B2MF02 | -                               |

\* NEC PDP Module include X-SUS PCB, Y-SUS PCB, CONNECTION PCB.

\* LVDS : Low Voltage Differential Signal.

## TEST RESULT

### <Mode : Scrolling "H" Pattern>

#### Conducted emissions : 450 kHz - 30 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT  
Min. limit margin QP : 9.0, AV : 3.7 dB at 0.159 MHz  
Remarks : See test-graph to be attached at pages 14~16.

#### Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT  
Min. limit margin 4.2 dB at 162.6 MHz  
Remarks : See test-data at page 20~21.

### <Mode : Color bar>

#### Conducted emissions : 450 kHz - 30 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT  
Min. limit margin QP : 8.5, AV : 3.5 dB at 0.159 MHz  
Remarks : See test-graph to be attached at pages 17~19.

#### Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT  
Min. limit margin 5.6 dB at 200.4 MHz  
Remarks : See test-data at page 22~23.

**Test Set-Up**  
**(Type : DSP-4280GM, Mode : Scrolling “H” Pattern)**



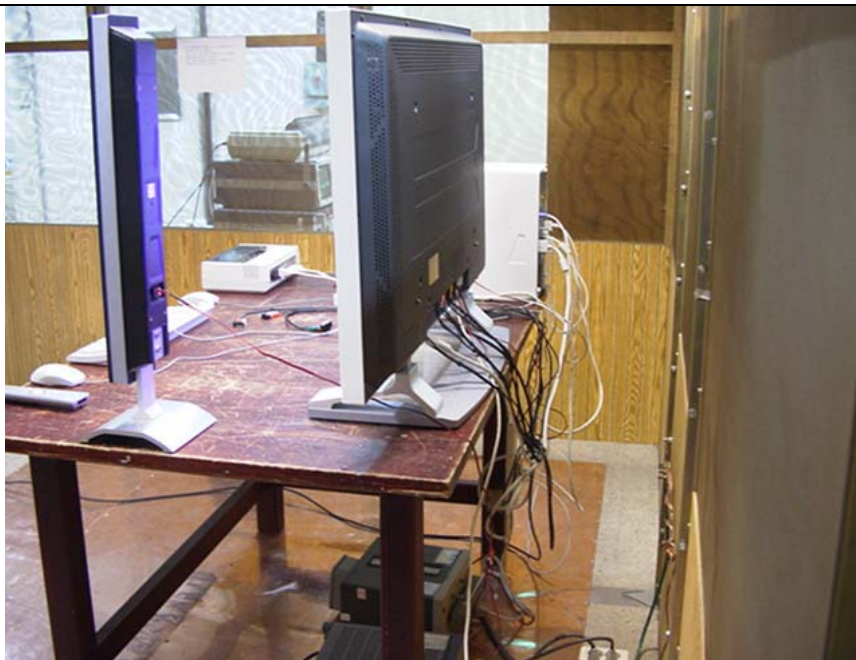
**Conducted emission : 450kHz ~ 30MHz**



**Test Set-Up**  
**(Type : DSP-4280GM, Mode : Color bar)**



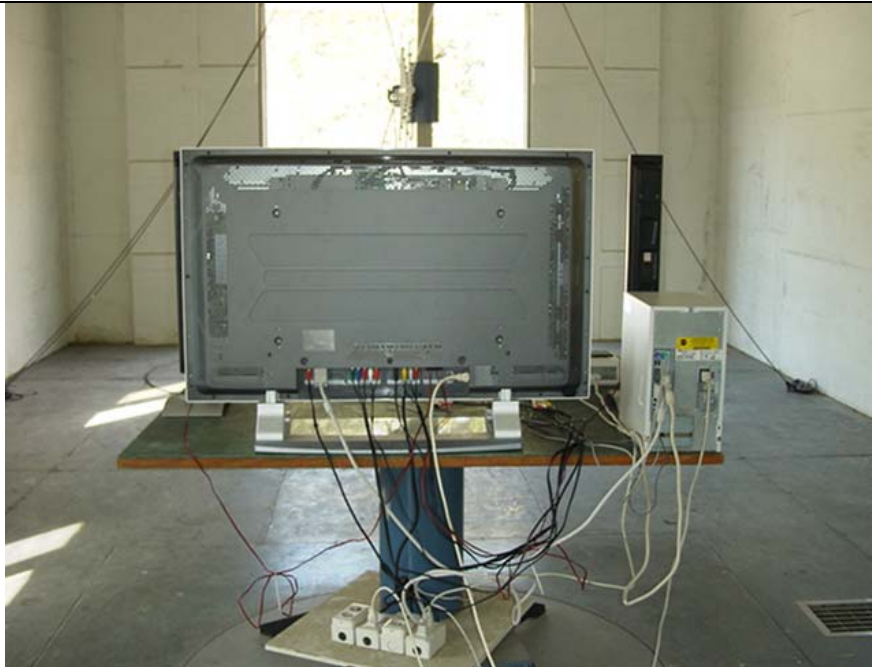
**Conducted emission : 450kHz ~ 30MHz**



**Test Set-Up**  
**(Type : DSP-4280GM, Mode : Scrolling “H” Pattern)**



**Radiated emission : 30MHz ~ 1000MHz**

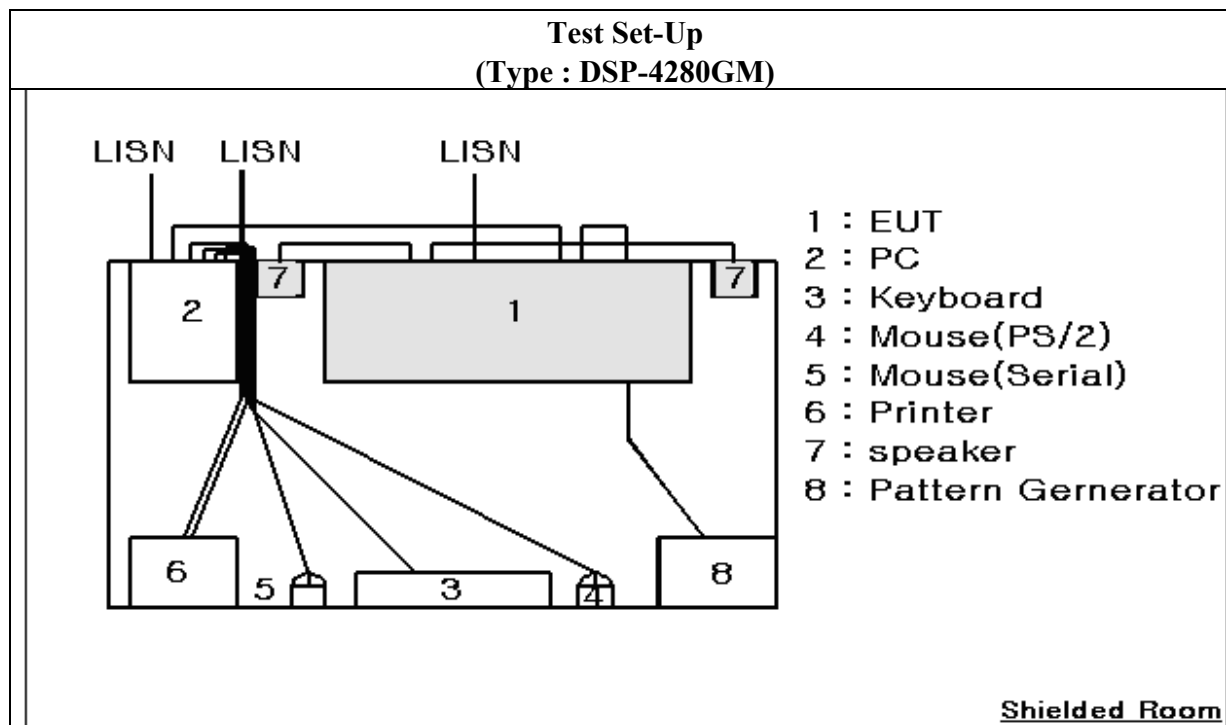


**Test Set-Up**  
**(Type : DSP-4280GM, Mode : Color bar)**

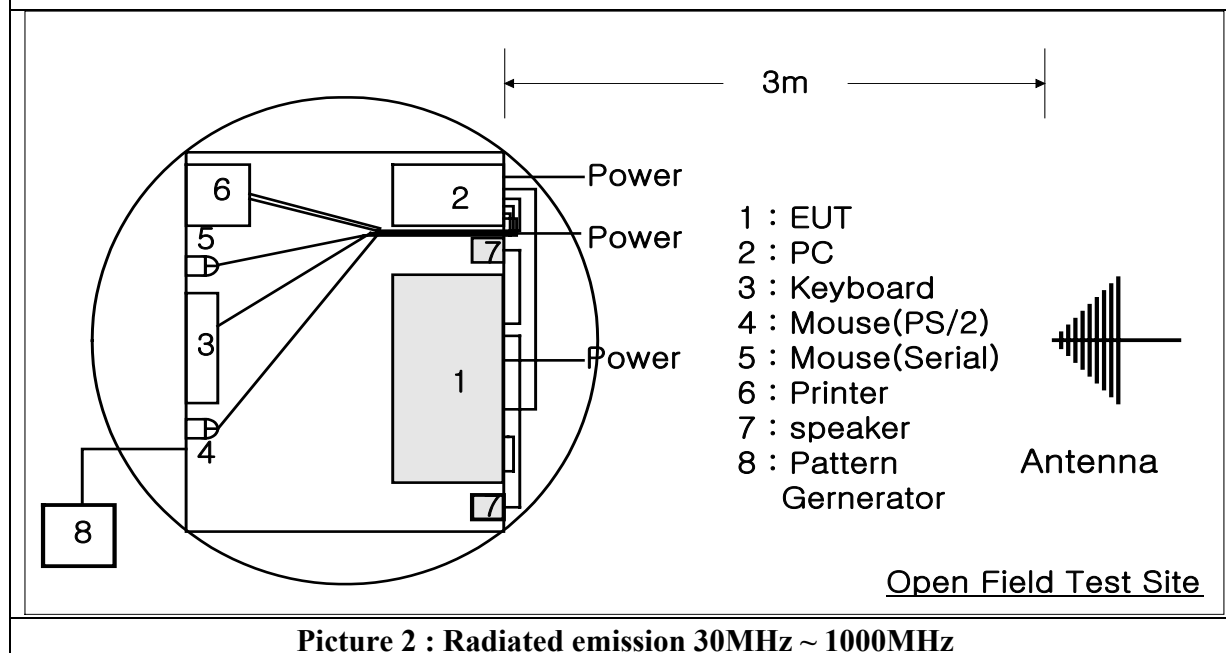


**Radiated emission : 30MHz ~ 1000MHz**





Picture 1 : Conducted emission 450kHz ~ 30MHz



Picture 2 : Radiated emission 30MHz ~ 1000MHz

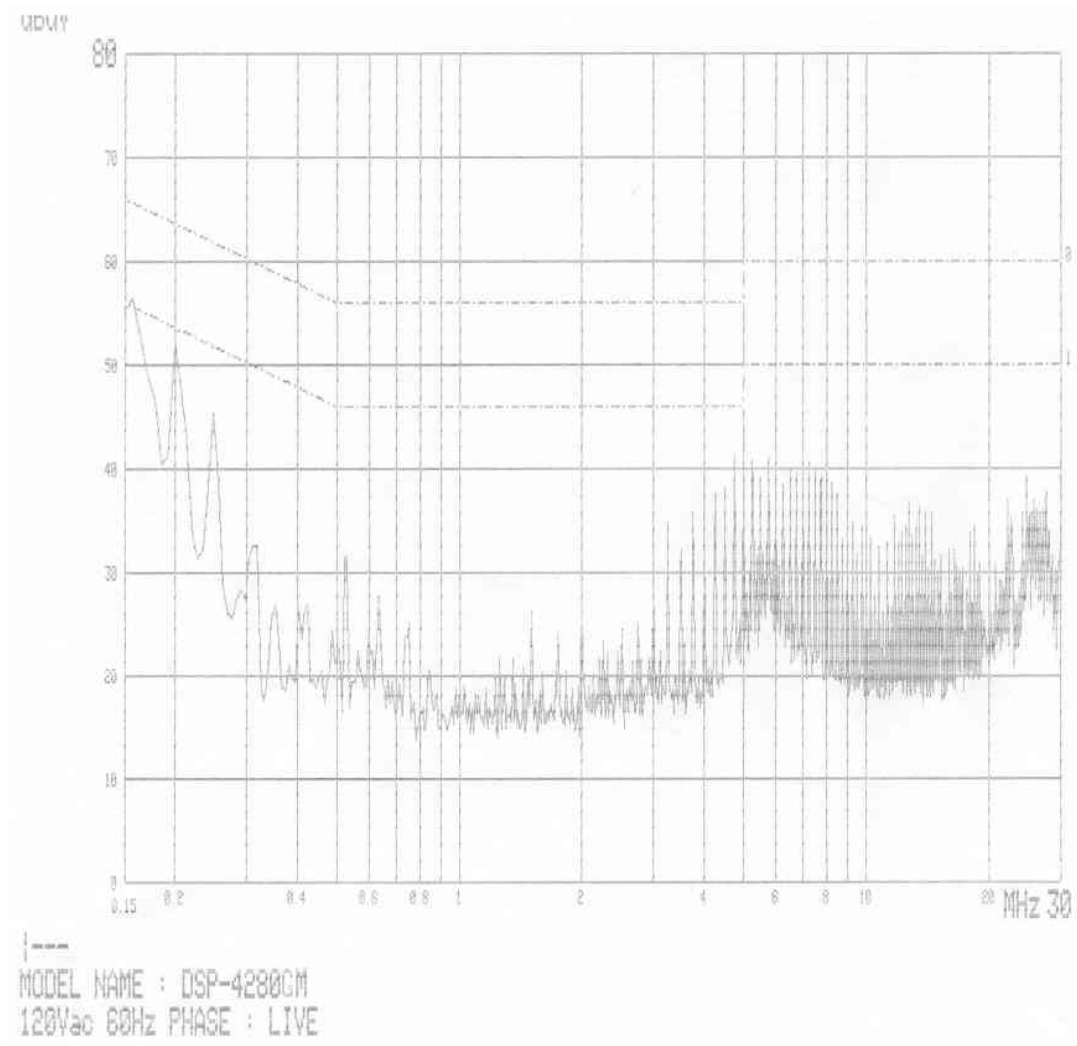
## Conducted Emission Test Data

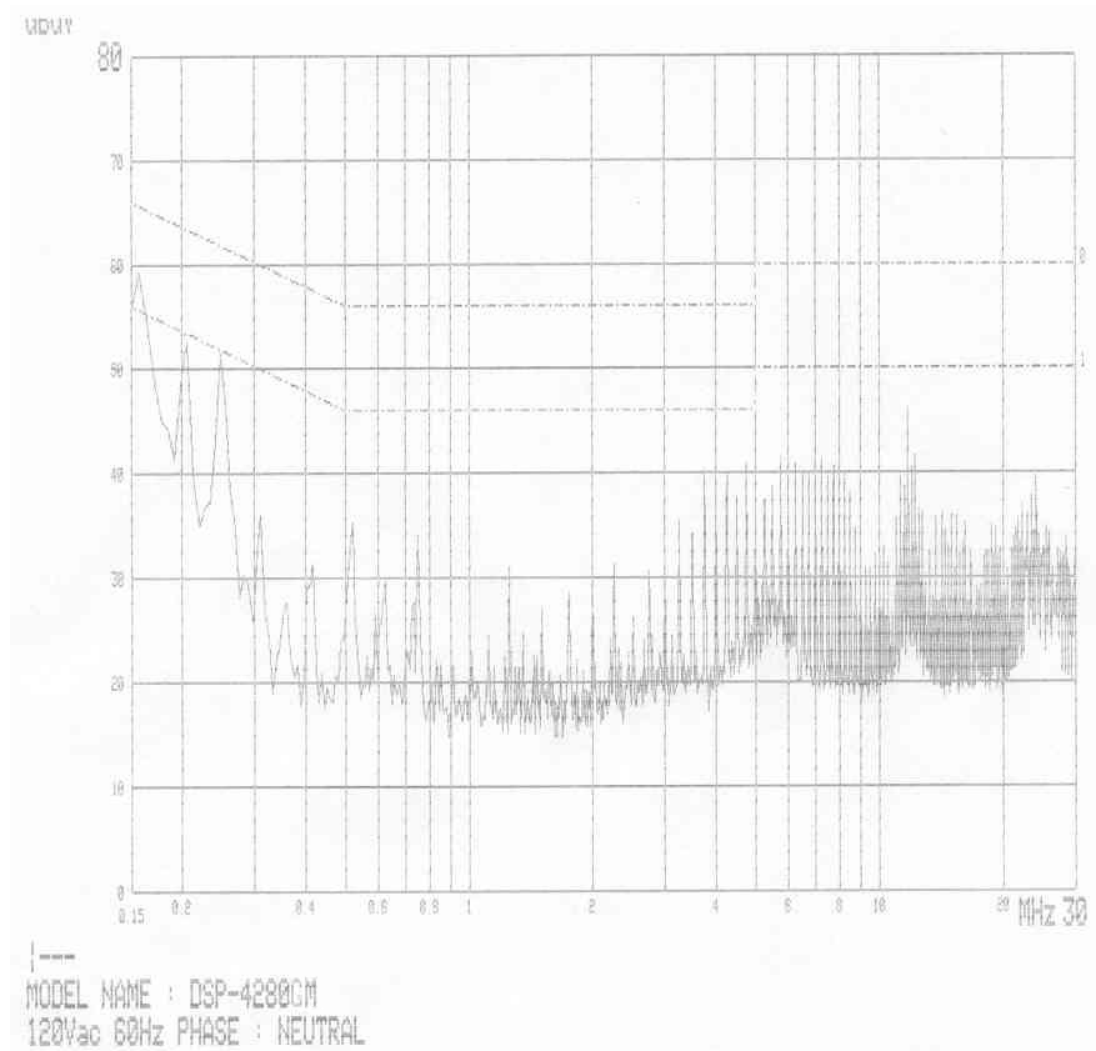
Type : DSP-4280GM  
 Manufacturer : Daewoo Electronics Corp.  
 Operation mode : Scrolling "H" pattern display 1600 X 1200, 75Hz  
 Date : Mar. 10, 2003

### Highest Emissions relative to the limit

| Frequency<br>[MHz]                    | Reading<br>[dBμV] |      | Insertion<br>Loss | Cable<br>Loss | Phase<br>(*L1/<br>**N) | Limit<br>[dBμV] |      | Margin<br>[dB] |      |
|---------------------------------------|-------------------|------|-------------------|---------------|------------------------|-----------------|------|----------------|------|
|                                       | Q-peak            | AV   | [dB]              | [dBμV]        |                        | Q-peak          | AV   | Q-peak         | AV   |
|                                       |                   |      |                   |               |                        |                 |      |                |      |
| 0.159                                 | 54.1              | 49.4 | 0.2               | 0.5           | L1*                    | 65.5            | 55.5 | 10.7           | 5.4  |
| 0.200                                 | 46.9              | 42.2 | 0.2               | 0.5           |                        | 63.6            | 53.6 | 16.0           | 10.7 |
| 3.749                                 | 33.5              | 11.0 | 0.0               | 0.5           |                        | 56.0            | 46.0 | 21.9           | 34.4 |
| 4.750                                 | 39.7              | 14.2 | 0.0               | 0.5           |                        | 56.0            | 46.0 | 15.8           | 31.3 |
| 5.748                                 | 37.8              | 15.2 | 0.0               | 0.6           |                        | 60.0            | 50.0 | 21.6           | 34.2 |
| 7.249                                 | 38.2              | 13.2 | 0.1               | 0.7           |                        | 60.0            | 50.0 | 21.1           | 36.1 |
| 0.159                                 | 55.9              | 51.2 | 0.1               | 0.5           | N**                    | 65.5            | 55.5 | 9.0            | 3.7  |
| 0.251                                 | 47.7              | 21.7 | 0.1               | 0.5           |                        | 61.7            | 51.7 | 13.4           | 29.4 |
| 3.748                                 | 36.4              | 13.6 | 0.0               | 0.5           |                        | 56.0            | 46.0 | 19.0           | 31.8 |
| 4.751                                 | 31.1              | 13.7 | 0.0               | 0.5           |                        | 56.0            | 46.0 | 24.3           | 31.7 |
| 5.750                                 | 35.1              | 13.3 | 0.1               | 0.6           |                        | 60.0            | 50.0 | 24.3           | 36.1 |
| 11.751                                | 32.2              | 10.9 | 0.2               | 0.6           |                        | 60.0            | 50.0 | 27.0           | 38.3 |
| *L1 : Live Line    **N : Neutral Line |                   |      |                   |               |                        |                 |      |                |      |

\*\*\* Please refer to data graphs at page 15 ~ 16





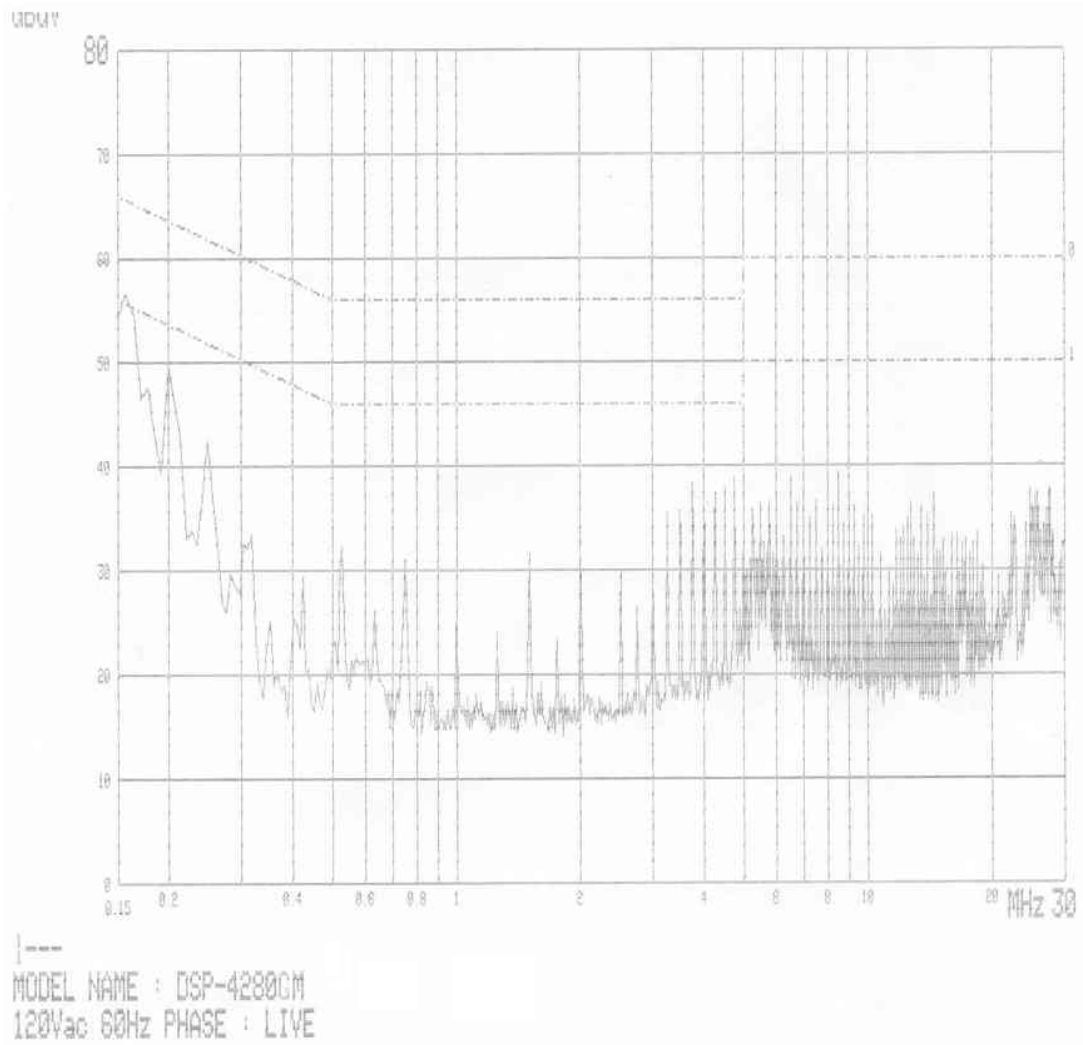
## Conducted Emission Test Data

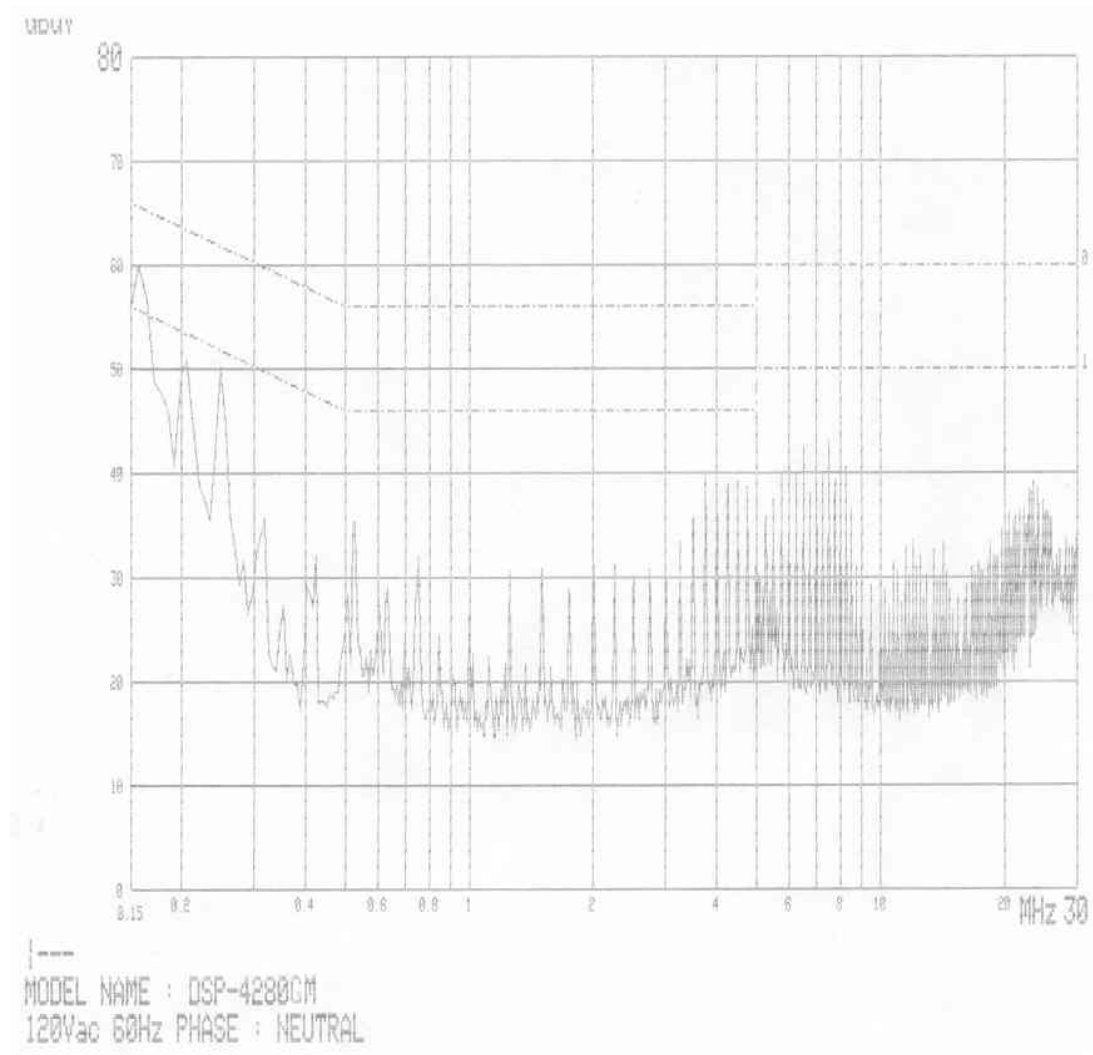
Type : DSP-4280GM  
 Manufacturer : Daewoo Electronics Corp.  
 Operation mode : Color bar  
 Date : Mar. 10, 2003

### Highest Emissions relative to the limit

| Frequency<br>[MHz]                    | Reading<br>[dBμV] |      | Insertion<br>Loss<br>[dB] | Cable<br>Loss<br>[dBμV] | Phase<br>(*L1/<br>**N) | Limit<br>[dBμV] |      | Margin<br>[dB] |      |
|---------------------------------------|-------------------|------|---------------------------|-------------------------|------------------------|-----------------|------|----------------|------|
|                                       | Q-peak            | AV   |                           |                         |                        | Q-peak          | AV   | Q-peak         | AV   |
| 0.159                                 | 54.2              | 49.3 | 0.2                       | 0.5                     | L1*                    | 65.5            | 55.5 | 10.6           | 5.5  |
| 0.203                                 | 46.4              | 42.8 | 0.2                       | 0.5                     |                        | 63.5            | 53.5 | 16.4           | 10.0 |
| 4.000                                 | 36.2              | 10.8 | 0.0                       | 0.5                     |                        | 56.0            | 46.0 | 19.2           | 34.6 |
| 4.751                                 | 34.9              | 11.3 | 0.0                       | 0.5                     |                        | 56.0            | 46.0 | 20.6           | 34.2 |
| 6.500                                 | 36.1              | 12.4 | 0.1                       | 0.7                     |                        | 60.0            | 50.0 | 23.2           | 36.9 |
| 8.499                                 | 36.2              | 11.0 | 0.1                       | 0.6                     |                        | 60.0            | 50.0 | 23.1           | 38.3 |
| 0.159                                 | 56.4              | 51.4 | 0.1                       | 0.5                     | N**                    | 65.5            | 55.5 | 8.5            | 3.5  |
| 0.250                                 | 47.7              | 21.1 | 0.1                       | 0.5                     |                        | 61.8            | 51.8 | 13.5           | 30.1 |
| 3.751                                 | 35.4              | 11.2 | 0.0                       | 0.5                     |                        | 56.0            | 46.0 | 20.0           | 34.2 |
| 3.997                                 | 35.9              | 11.8 | 0.0                       | 0.5                     |                        | 56.0            | 46.0 | 19.5           | 33.6 |
| 6.500                                 | 38.5              | 10.8 | 0.1                       | 0.7                     |                        | 60.0            | 50.0 | 20.8           | 38.5 |
| 7.501                                 | 39.2              | 12.3 | 0.1                       | 0.7                     |                        | 60.0            | 50.0 | 20.0           | 36.9 |
| *L1 : Live Line    **N : Neutral Line |                   |      |                           |                         |                        |                 |      |                |      |

\*\*\* Please refer to data graphs at page 18 ~ 19



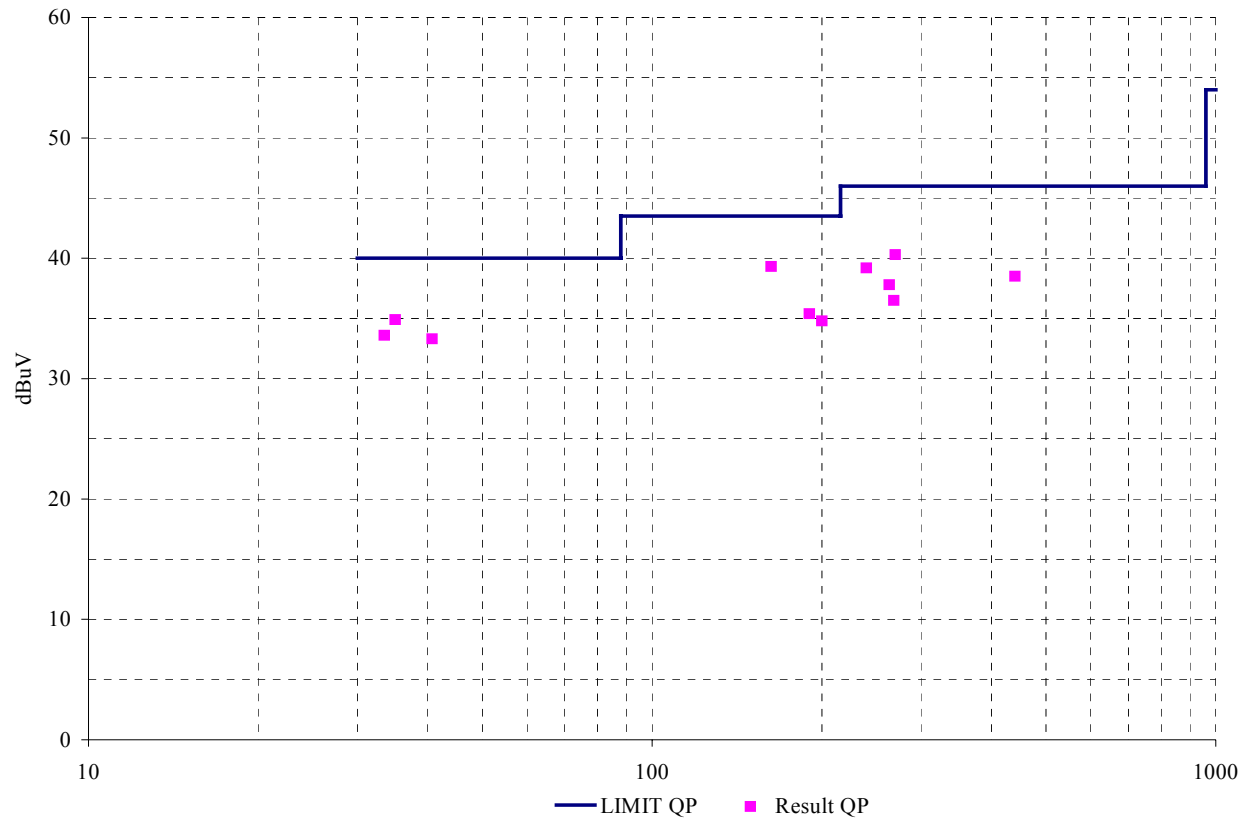


## Radiation Test Data

Type : DSP-4280GM  
 Manufacturer : Daewoo Electronics Corp.  
 Operation mode : Scrolling "H" pattern display 1600 X 1200, 75Hz  
 Test distance : 3 m  
 Antenna : VULB9160  
 Date : Mar. 12, 2003.

| Freq.<br>[MHz] | Reading<br>[dBuV] | Antenna<br>Factor<br>[dB] | Cable<br>Loss<br>[dB] | Angle<br>[deg] | Height<br>[cm] | Polar<br>[H/V] | Result<br>[dBuV] | Limit<br>[dBuV] | Margin<br>[dB] |
|----------------|-------------------|---------------------------|-----------------------|----------------|----------------|----------------|------------------|-----------------|----------------|
| 33.5           | 19.2              | 13.4                      | 1.0                   | 265            | 100            | V              | 33.6             | 40.0            | 6.4            |
| 35.0           | 20.5              | 13.4                      | 1.0                   | 195            | 100            | V              | 34.9             | 40.0            | 5.1            |
| 40.7           | 18.5              | 13.6                      | 1.2                   | 310            | 100            | V              | 33.3             | 40.0            | 6.7            |
| 162.6          | 24.6              | 12.3                      | 2.3                   | 316            | 286            | H              | 39.3             | 43.5            | 4.2            |
| 190.1          | 23.8              | 9.1                       | 2.5                   | 286            | 276            | H              | 35.4             | 43.5            | 8.1            |
| 200.0          | 23.7              | 8.6                       | 2.5                   | 112            | 312            | H              | 34.8             | 43.5            | 8.7            |
| 240.0          | 26.0              | 10.3                      | 2.9                   | 246            | 333            | H              | 39.2             | 46.0            | 6.8            |
| 263.4          | 23.5              | 11.4                      | 2.9                   | 260            | 297            | H              | 37.8             | 46.0            | 8.2            |
| 268.5          | 22.0              | 11.5                      | 3.0                   | 260            | 368            | H              | 36.5             | 46.0            | 9.5            |
| 270.0          | 25.7              | 11.6                      | 3.0                   | 188            | 300            | H              | 40.3             | 46.0            | 5.7            |
| 440.0          | 20.2              | 13.8                      | 4.5                   | 160            | 100            | V              | 38.5             | 46.0            | 7.5            |
| 720.0          | 13.5              | 19.0                      | 5.1                   | 128            | 100            | V              | 37.5             | 46.0            | 8.5            |

**MEASUREMENT OF DISTURBANCE RADIATION**  
**(Test mode : Scrolling "H" pattern)**

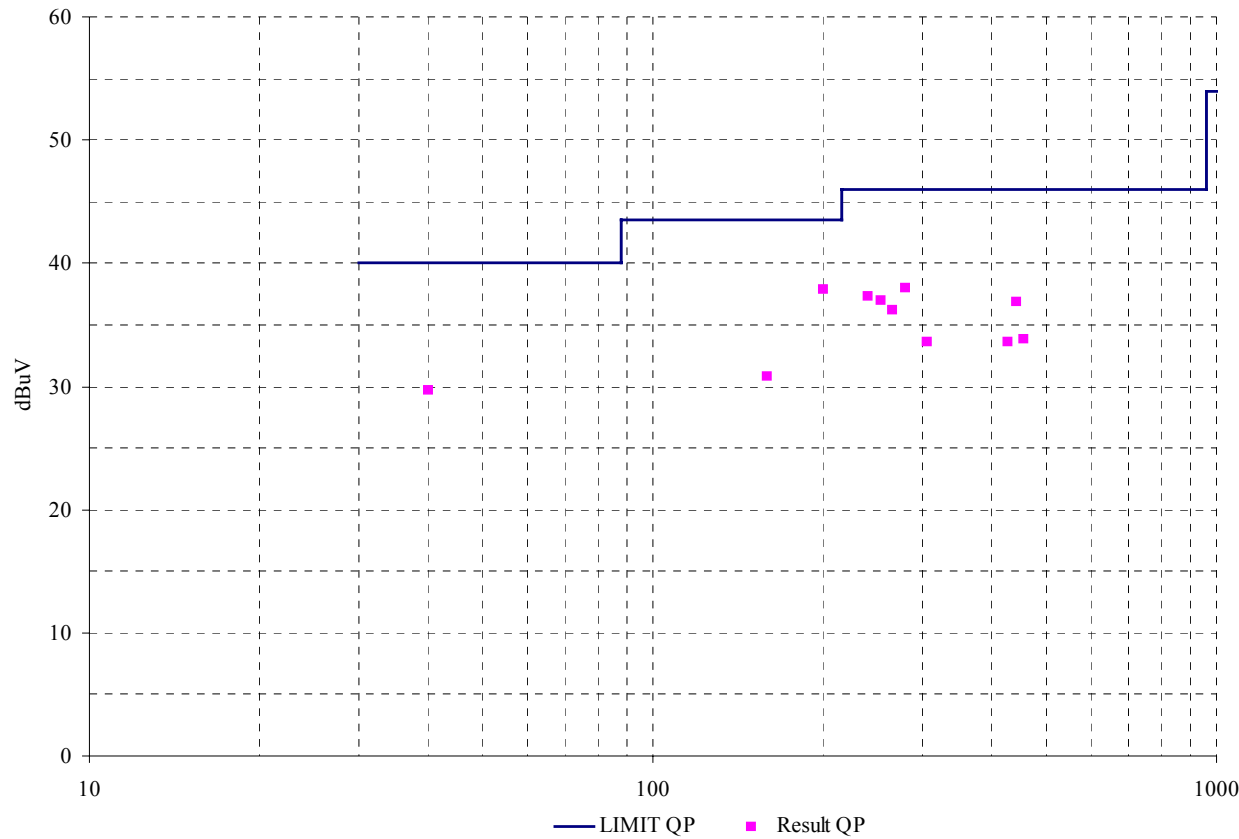


## Radiation Test Data

Type : DSP-4280GM  
 Manufacturer : Daewoo Electronics Corp.  
 Operation mode : Color bar  
 Test distance : 3 m  
 Antenna : VULB9160  
 Date : Mar. 13, 2003.

| Freq.<br>[MHz] | Reading<br>[dBuV] | Antenna<br>Factor<br>[dB] | Cable<br>Loss<br>[dB] | Angle<br>[deg] | Height<br>[cm] | Polar<br>[H/V] | Result<br>[dBuV] | Limit<br>[dBuV] | Margin<br>[dB] |
|----------------|-------------------|---------------------------|-----------------------|----------------|----------------|----------------|------------------|-----------------|----------------|
| 40.0           | 14.9              | 13.6                      | 1.2                   | 286            | 100            | V              | 29.7             | 40.0            | 10.3           |
| 159.6          | 16.2              | 12.3                      | 2.3                   | 276            | 100            | V              | 30.8             | 43.5            | 12.7           |
| 200.4          | 26.9              | 8.5                       | 2.5                   | 163            | 269            | H              | 37.9             | 43.5            | 5.6            |
| 240.0          | 24.2              | 10.3                      | 2.9                   | 312            | 315            | H              | 37.4             | 46.0            | 8.6            |
| 253.4          | 23.2              | 10.9                      | 2.8                   | 333            | 388            | H              | 37.0             | 46.0            | 9.0            |
| 266.5          | 21.8              | 11.5                      | 3.0                   | 270            | 360            | H              | 36.2             | 46.0            | 9.8            |
| 280.0          | 23.0              | 11.9                      | 3.1                   | 132            | 278            | H              | 38.0             | 46.0            | 8.0            |
| 306.5          | 18.6              | 11.7                      | 3.3                   | 215            | 265            | H              | 33.6             | 46.0            | 12.4           |
| 426.6          | 15.5              | 13.7                      | 4.4                   | 246            | 100            | V              | 33.6             | 46.0            | 12.5           |
| 440.0          | 18.6              | 13.8                      | 4.5                   | 277            | 100            | V              | 36.9             | 46.0            | 9.1            |
| 453.1          | 15.4              | 14.0                      | 4.5                   | 319            | 100            | V              | 33.9             | 46.0            | 12.1           |
| 480.0          | 14.5              | 14.6                      | 4.8                   | 206            | 100            | V              | 33.9             | 46.0            | 12.2           |

**MEASUREMENT OF DISTURBANCE RADIATION**  
**(Test mode : Color bar)**



## SUMMARY

### GENERAL REMARKS :

The equipment is not modified anything, mechanical or circuit to improve EMI status during a measurement and complied the regulation "Part 15 subpart B Class B of CFR 47"

### FINAL JUDGMENT :

The requirements according to the technical regulations are

☒ Kept ☐ Not kept

The equipment under test does

☒ Fulfill the general approval requirements mentioned on page 3.  
☐ Not fulfill the general approval requirements mentioned on page 3.

Begin of testing : Mar. 10, 2003

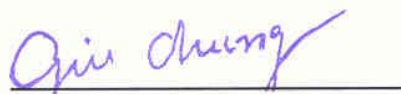
End of testing : Mar. 13, 2003

Reviewed by :



Joon H. Lee / EMC Manager  
IST EMC Lab.

Approved by :



G. Chung / Chief of EMC Lab.