



EMISSION TEST REPORT

Test report file No. : **02-IST-241/FA** Date of issue : Nov. 20, 2002.

Model / Type No. : DSP-4284GM ☐ 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 32 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

A) Documentation.	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>8~9</u>
Test-setups (Photos)	<u>10~15</u>
Test-setup (Figures)	<u>16</u>
Summary	<u>32</u>
B) Test Data.	
Conducted emissions (Mains)	: 450 kHz - 30 MHz <u>17~25</u>
Radiated emissions	: 30 MHz – 1 GHz <u>26~31</u>
C) Appendix	

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>18</u>
Humidity	<u>36</u> %
Atmospheric pressure	<u>1004</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 :



Y. J. Kim / Research 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 :



Y. J. Kim / Research 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 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(1), Component(2), Video IN(4), Speaker Out(2), DVI-D(1)
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
 - DVI “H” Character

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 : 1.5m
- 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-4284GM)

1. Power



Original : RS-232C port



Changed : DVI-D port, DVI Audio IN

2. Model name

Original : DSP-4280GM

Changed : DSP-4284GM(add)

TEST RESULT

<Mode : Scrolling “H” Pattern>

Conducted emissions : 450 kHz - 30 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

7.0 dB

at 0.8337 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

4.1 dB

at 250.0 MHz

Remarks : See test-data at page 26~27.

<Mode : Color bar>

Conducted emissions : 450 kHz - 30 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

6.1 dB

at 0.8338 MHz

Remarks : See test-graph to be attached at pages 20~22.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

4.9 dB

at 31.9 MHz

Remarks : See test-data at page 28~29.

<Mode : DVI “H” Character>

Conducted emissions : 450 kHz - 30 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

9.2 dB

at 0.8323 MHz

Remarks : See test-graph to be attached at pages 23~25.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

4.6 dB

at 32.6 MHz

Remarks : See test-data at page 30~31.

Test Set-Up
(Type : DSP-4284GM, Mode : Scrolling “H” Pattern)



Conducted emission : 450kHz ~ 30MHz



Test Set-Up
(Type : DSP-4284GM, Mode : Color bar)



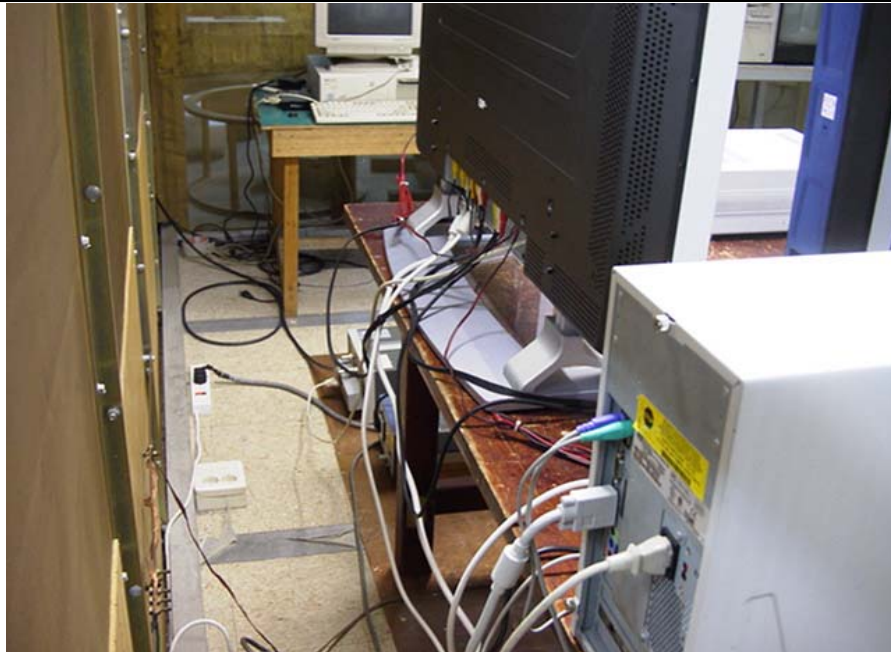
Conducted emission : 450kHz ~ 30MHz



Test Set-Up
(Type : DSP-4284GM, Mode : DVI “H” Character)



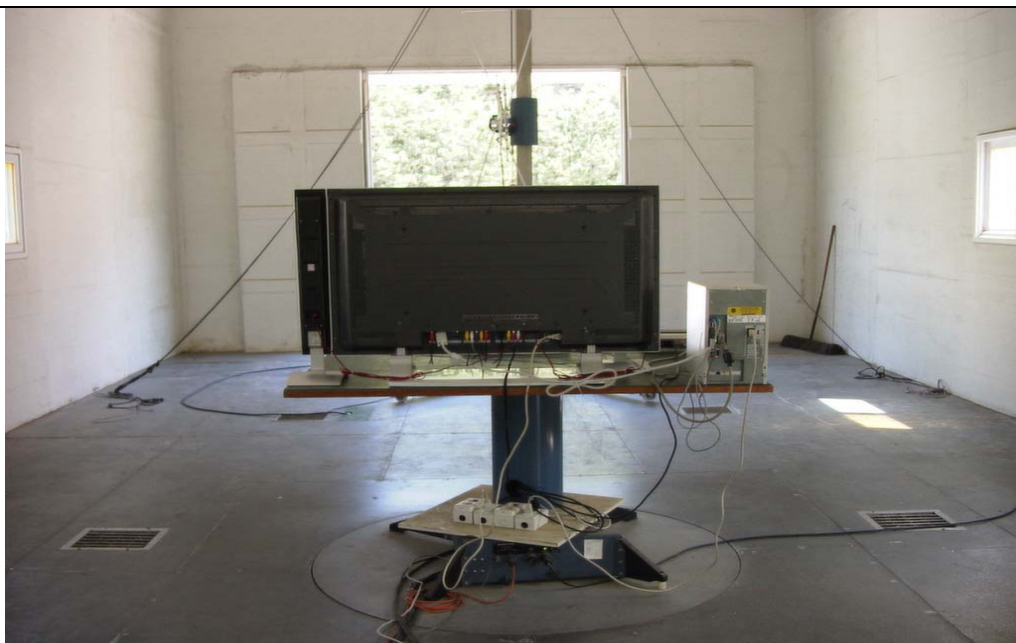
Conducted emission : 450kHz ~ 30MHz



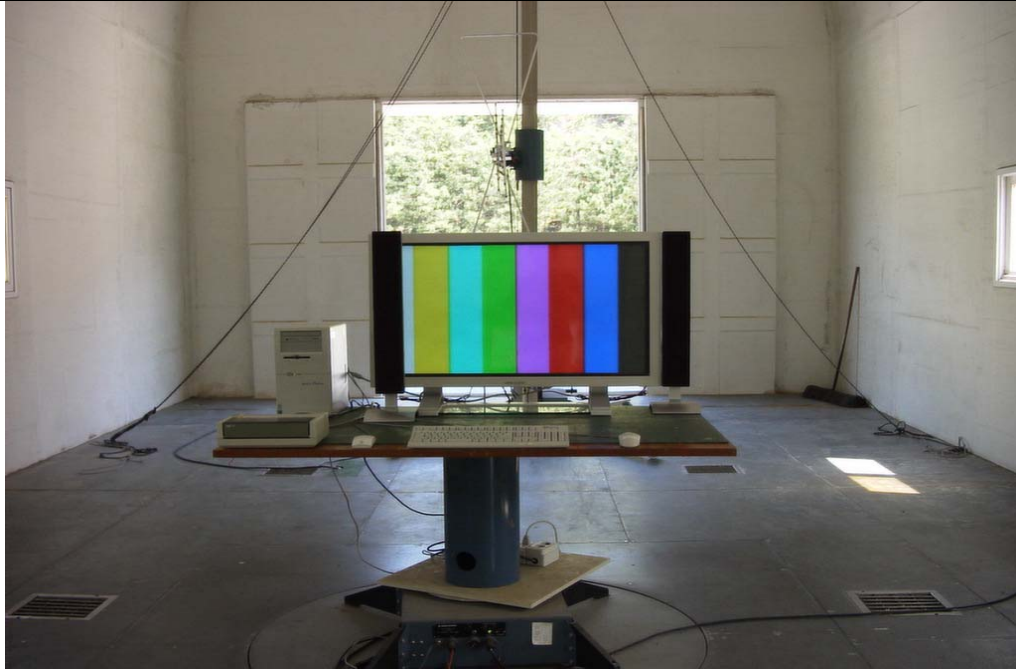
Test Set-Up
(Type : DSP-4284GM, Mode : Scrolling “H” Pattern)



Radiated emission : 30MHz ~ 1000MHz



Test Set-Up
(Type : DSP-4284GM, Mode : Color bar)



Radiated emission : 30MHz ~ 1000MHz

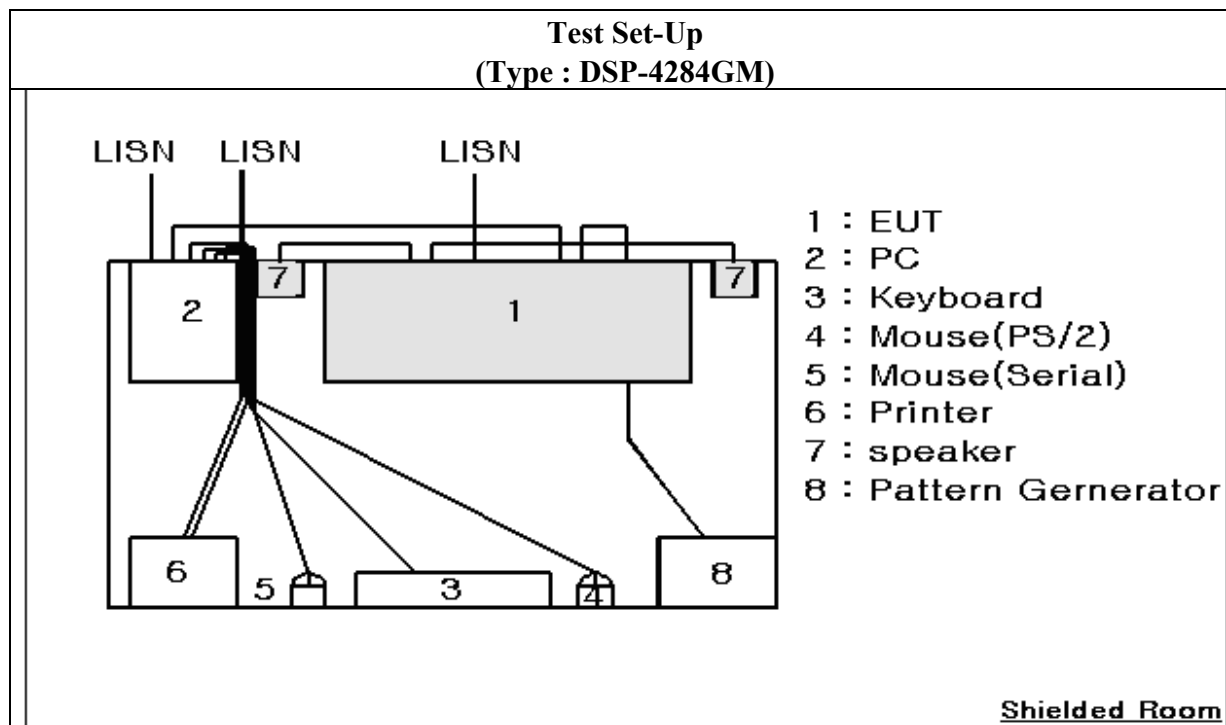


Test Set-Up
(Type : DSP-4284GM, Mode : DVI “H” Character)

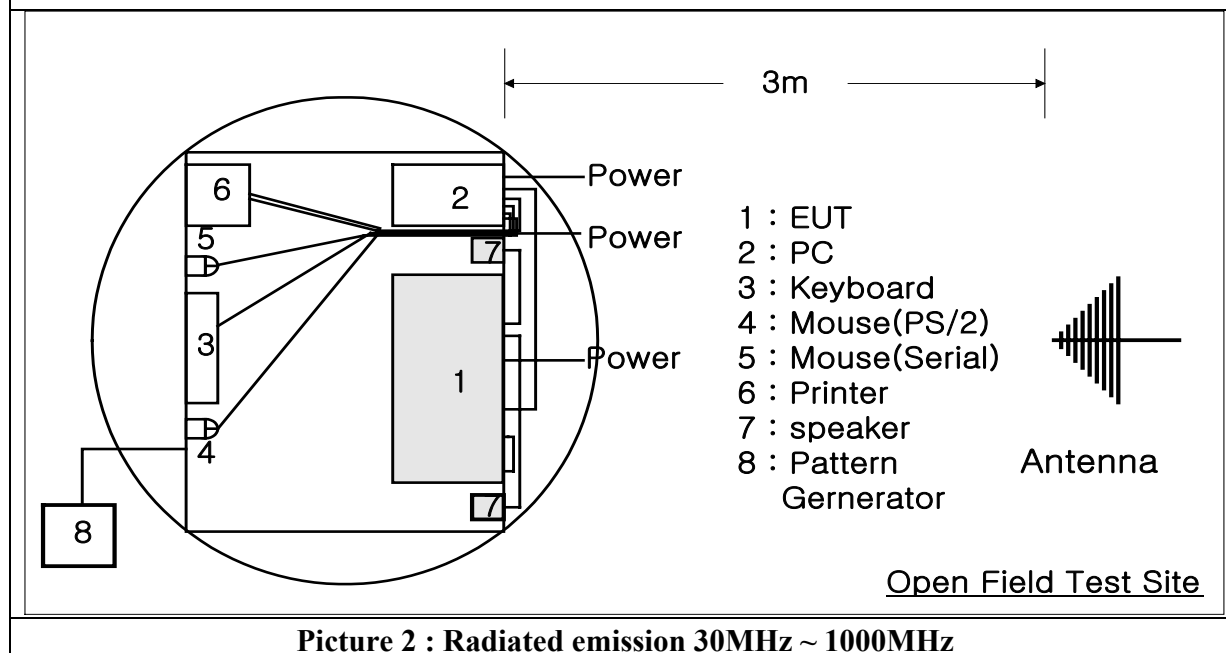


Radiated emission : 30MHz ~ 1000MHz





Picture 1 : Conducted emission 450kHz ~ 30MHz



Picture 2 : Radiated emission 30MHz ~ 1000MHz

Conducted Emission Test Data

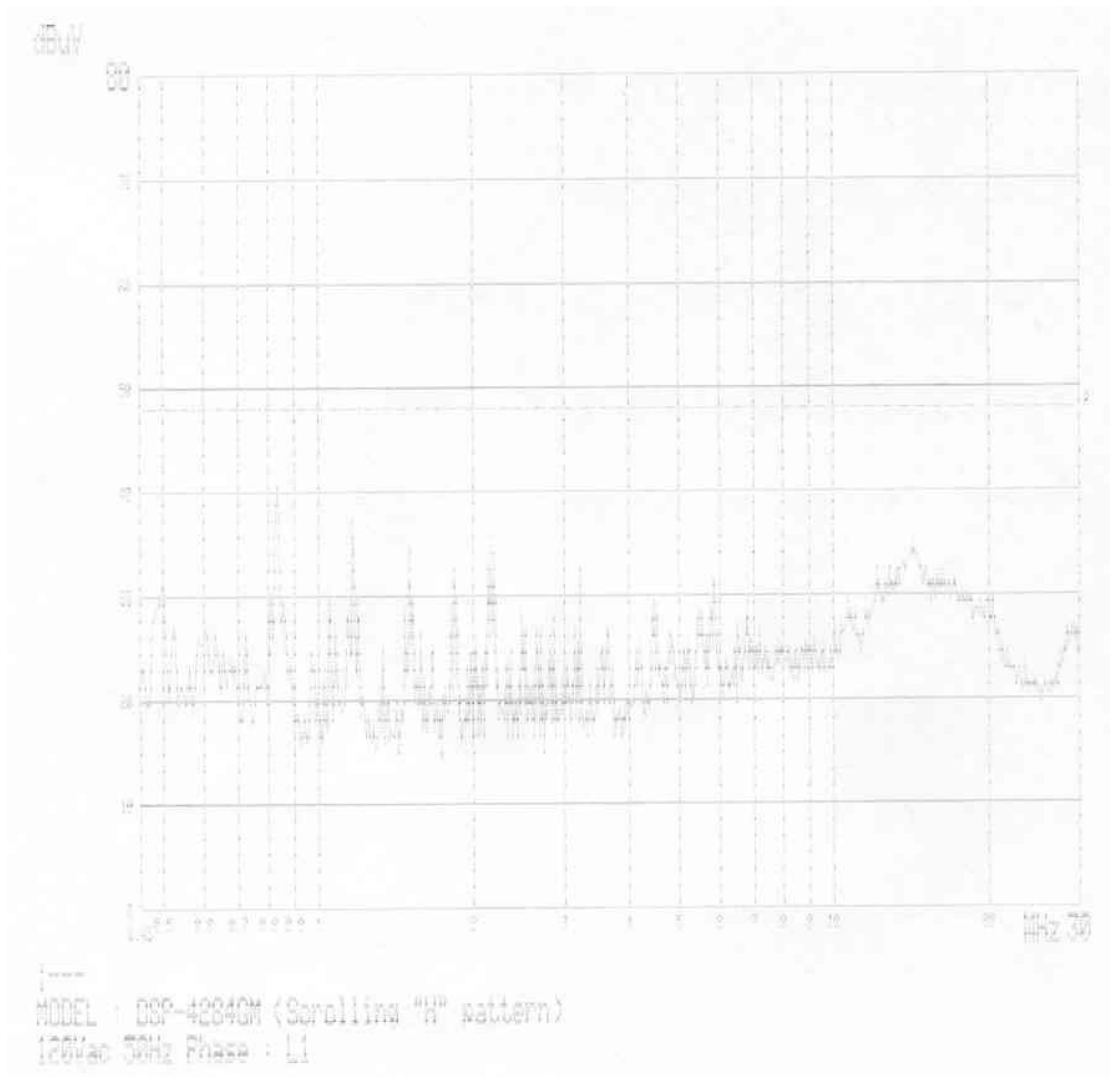
Type : DSP-4284GM
 Manufacturer : Daewoo Electronics Corp.
 Operation mode : Scrolling "H" pattern display 1600 X 1200, 75Hz
 Date : Nov. 01, 2002

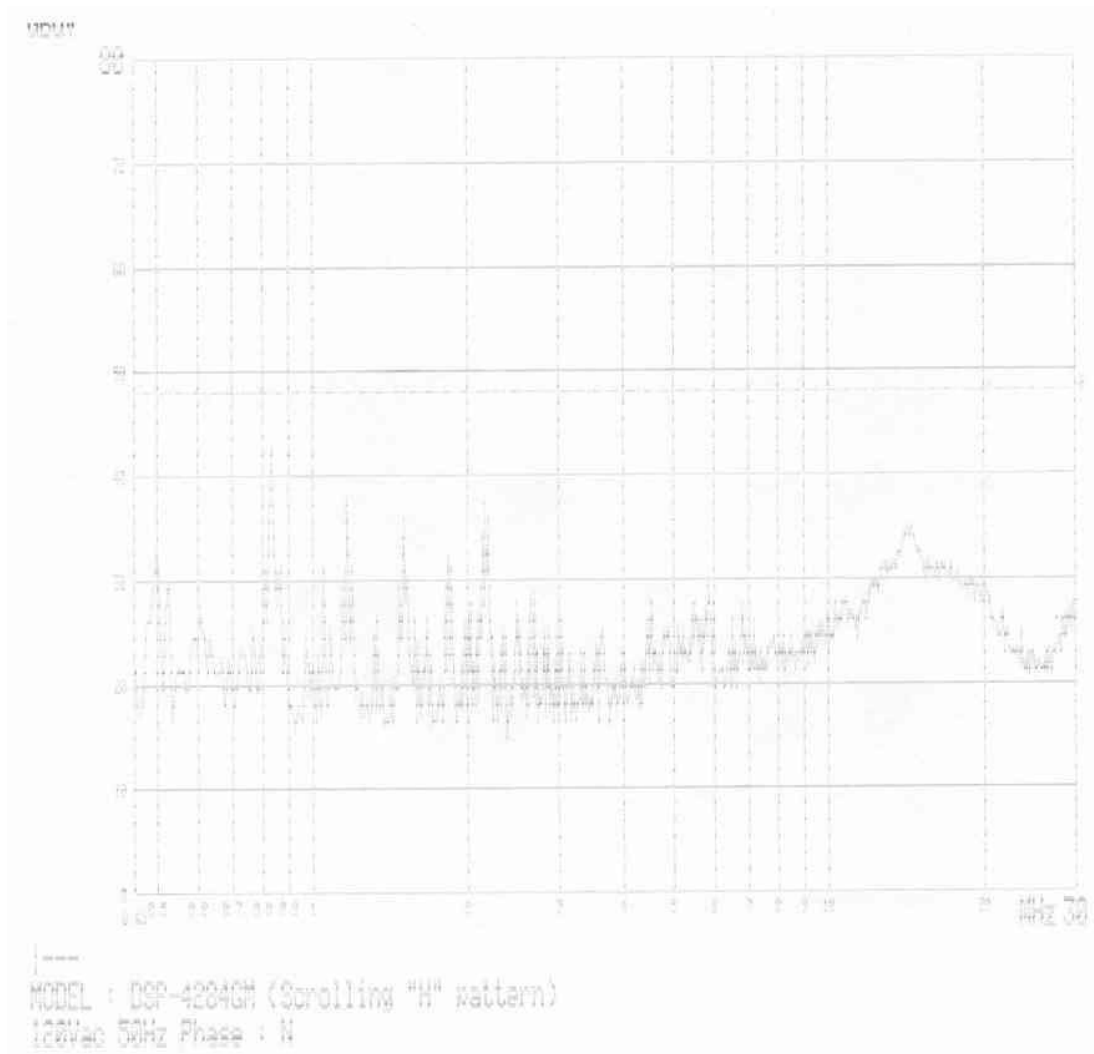
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.8335	38.3	0.8	L1	39.1	48.0	8.9
14.2088	29.5	0.8		30.3	48.0	17.7
0.8337	40.2	0.8	N	41.0	48.0	7.0
14.2014	28.6	0.8		29.4	48.0	18.6
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

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





Conducted Emission Test Data

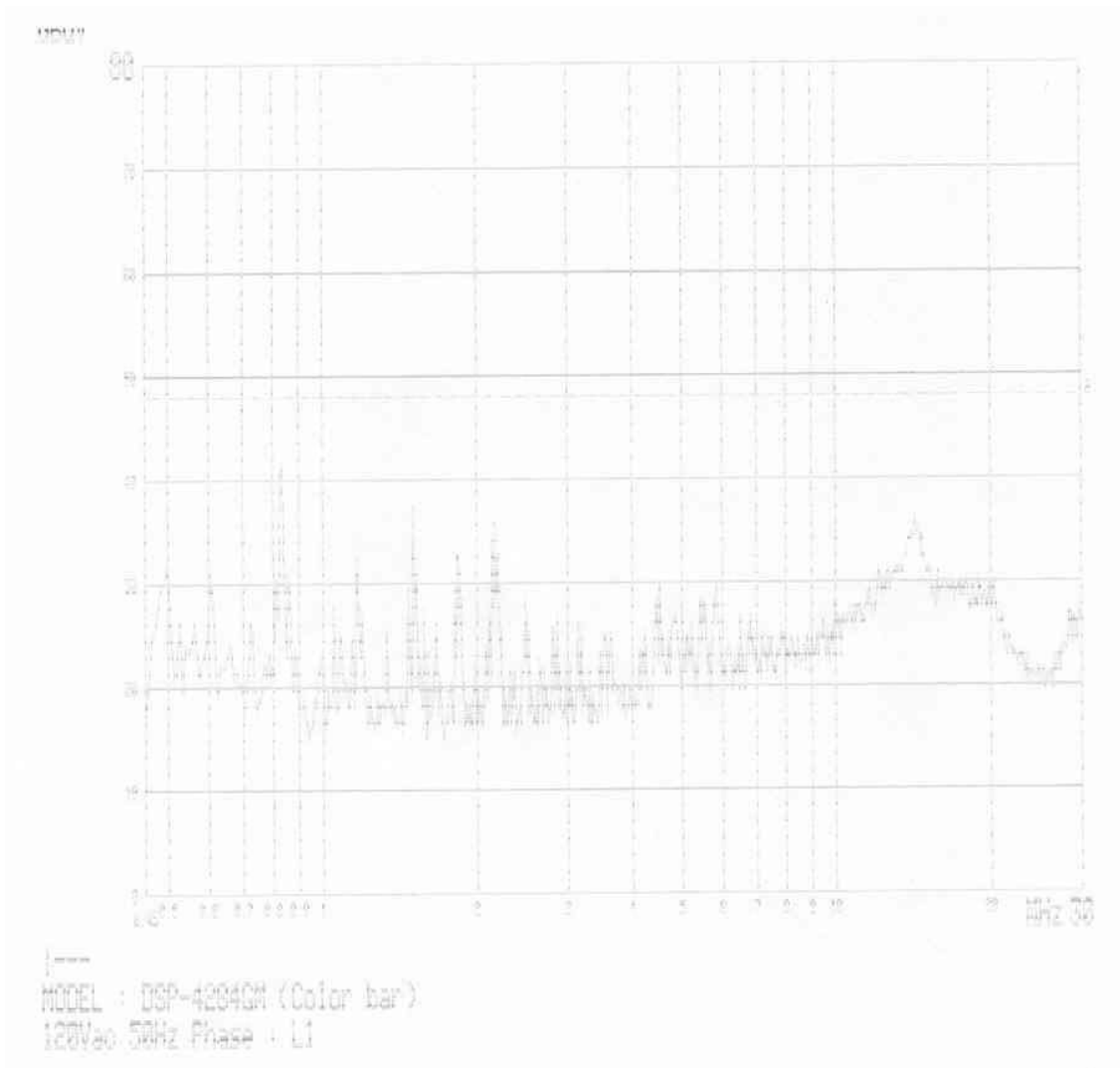
Type : DSP-4284GM
 Manufacturer : Daewoo Electronics Corp.
 Operation mode : Color bar
 Date : Nov. 01, 2002

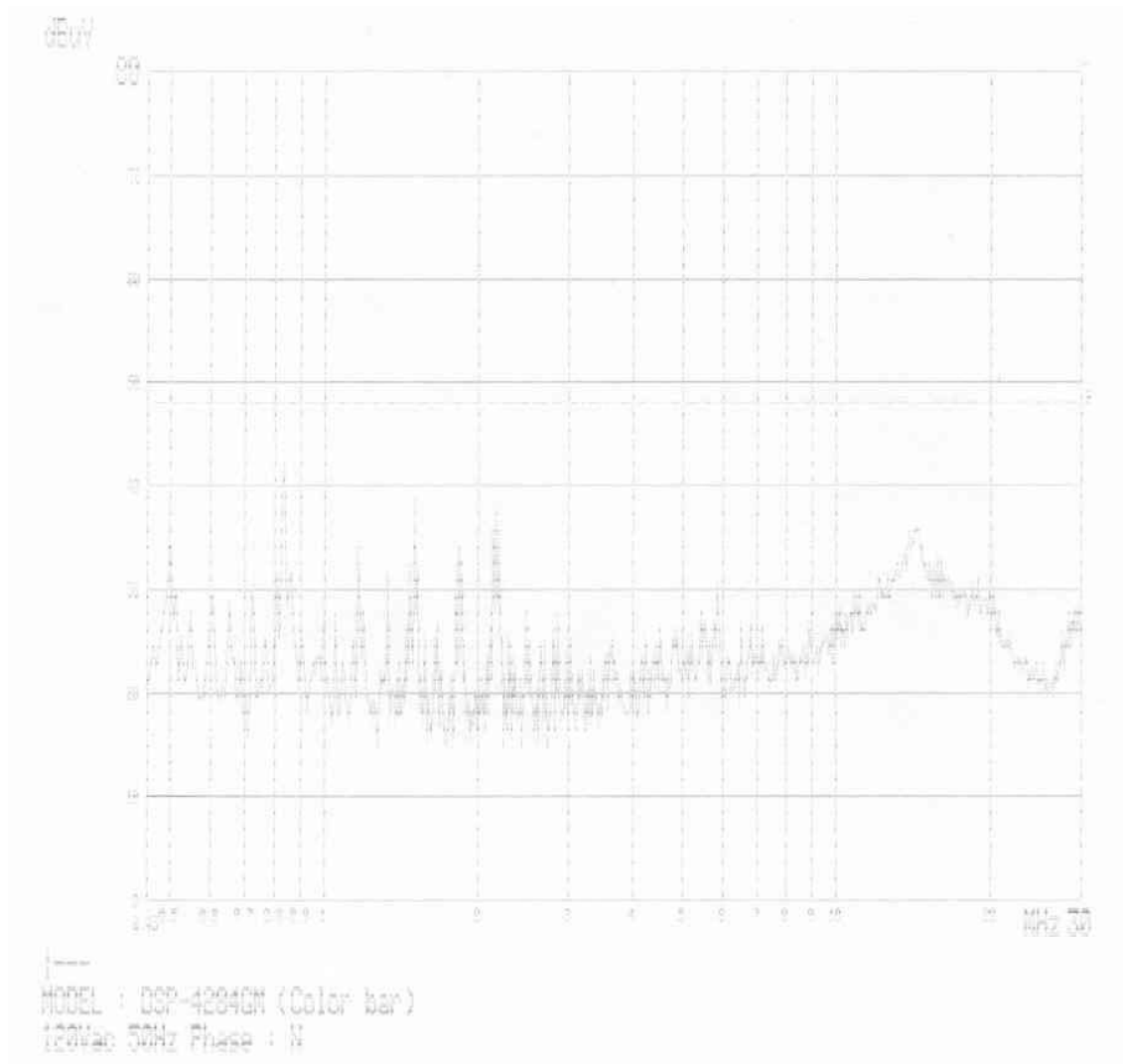
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.8337	40.1	0.8	L1	40.9	48.0	7.1
1.1669	31.1	0.8		31.9	48.0	16.1
14.2097	30.5	0.8		31.3	48.0	16.7
0.8338	41.1	0.8	N	41.9	48.0	6.1
1.1680	31.8	0.8		32.6	48.0	15.4
14.1896	31.2	0.8		32.0	48.0	16.0
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

*** Please refer to data graphs at page 21 ~ 22





Conducted Emission Test Data

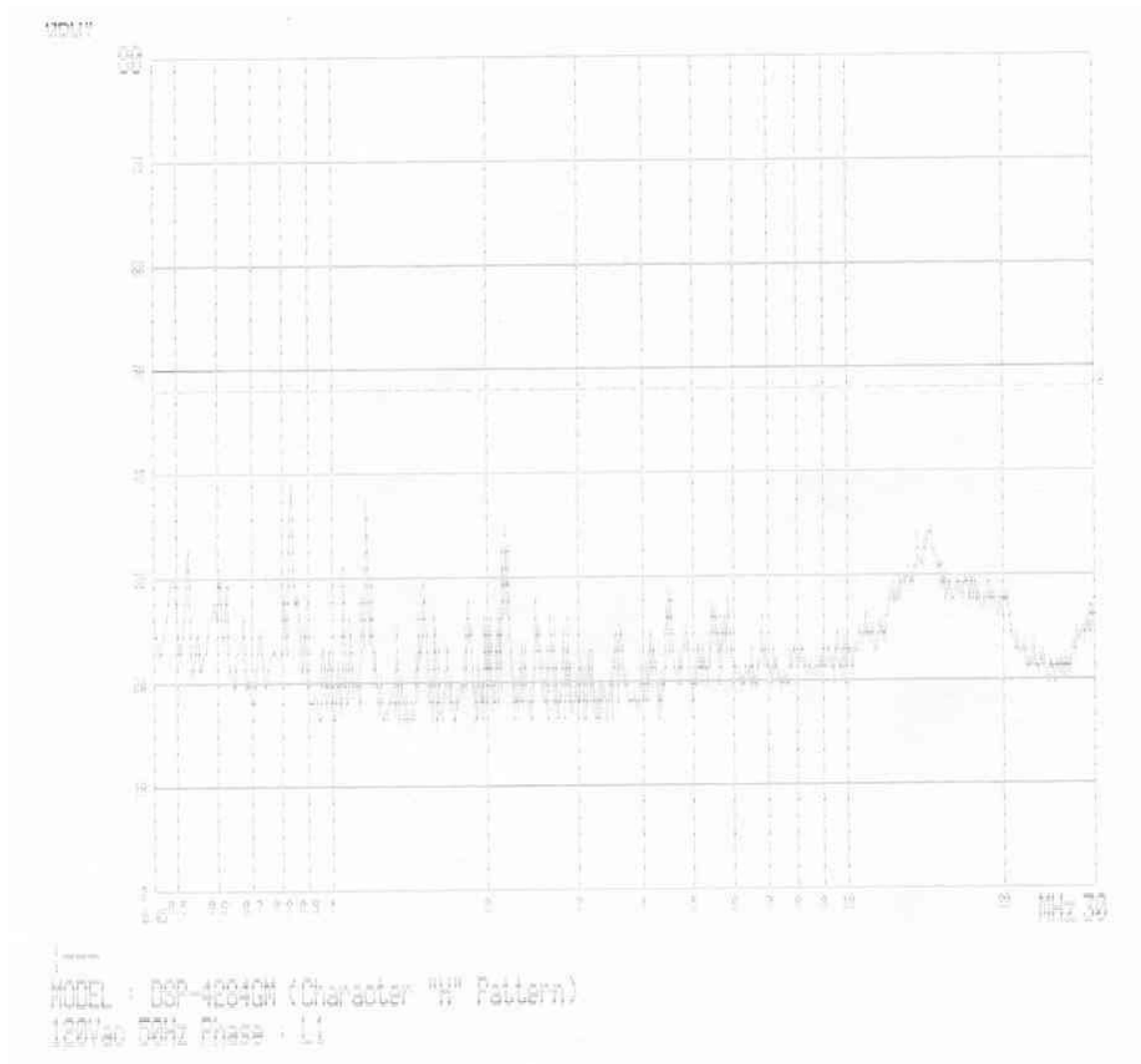
Type : DSP-4284GM
 Manufacturer : Daewoo Electronics Corp.
 Operation mode : DVI "H" Character
 Date : Nov. 01, 2002

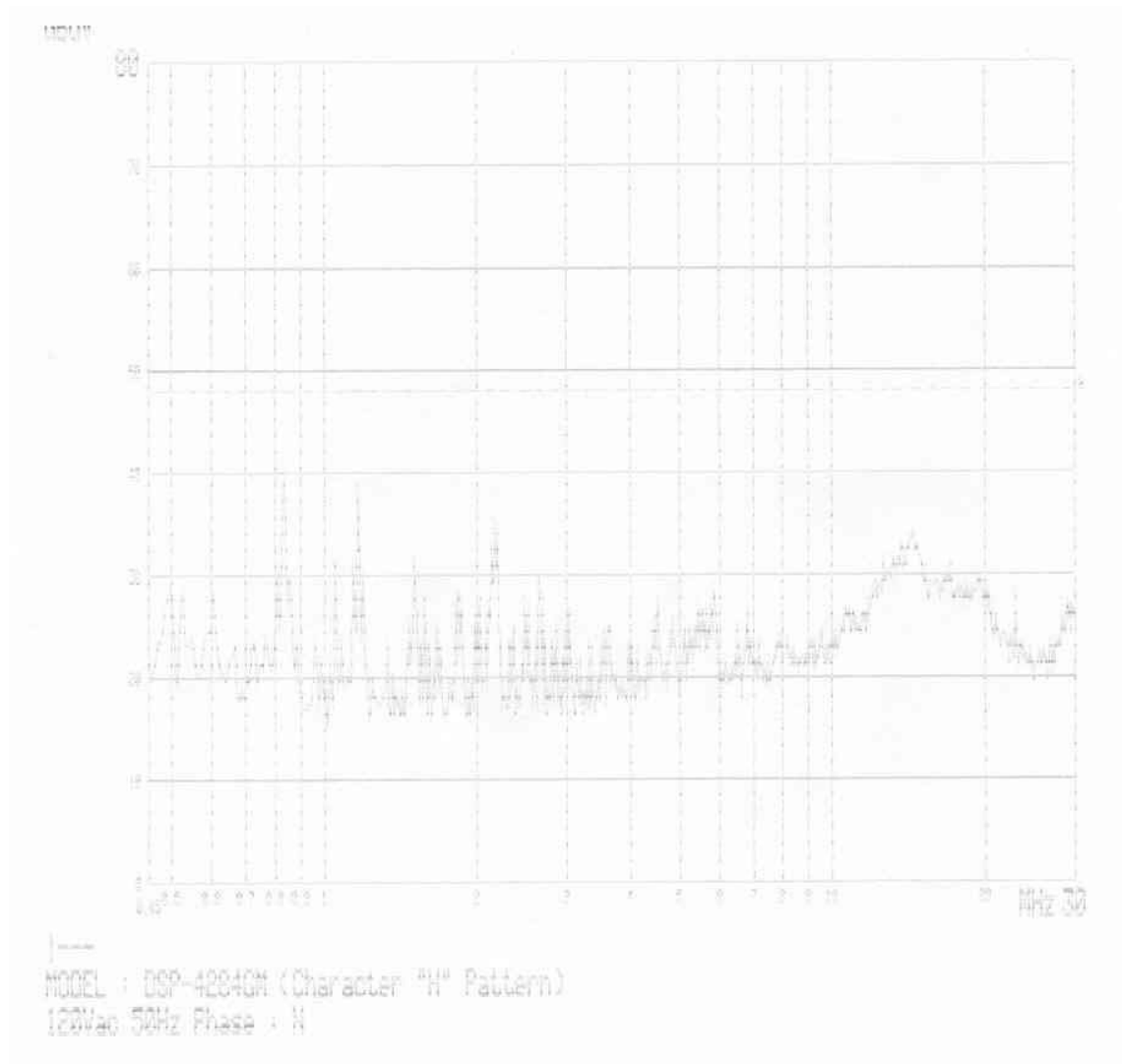
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.8330	37.0	0.8	L1	37.8	48.0	10.2
1.1677	36.0	0.8		36.8	48.0	11.2
14.2104	28.3	0.8		29.1	48.0	18.9
0.8323	38.0	0.8	N	38.8	48.0	9.2
1.1672	37.1	0.8		37.9	48.0	10.1
14.2136	29.0	0.8		29.8	48.0	18.2
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

*** Please refer to data graphs at page 24 ~ 25



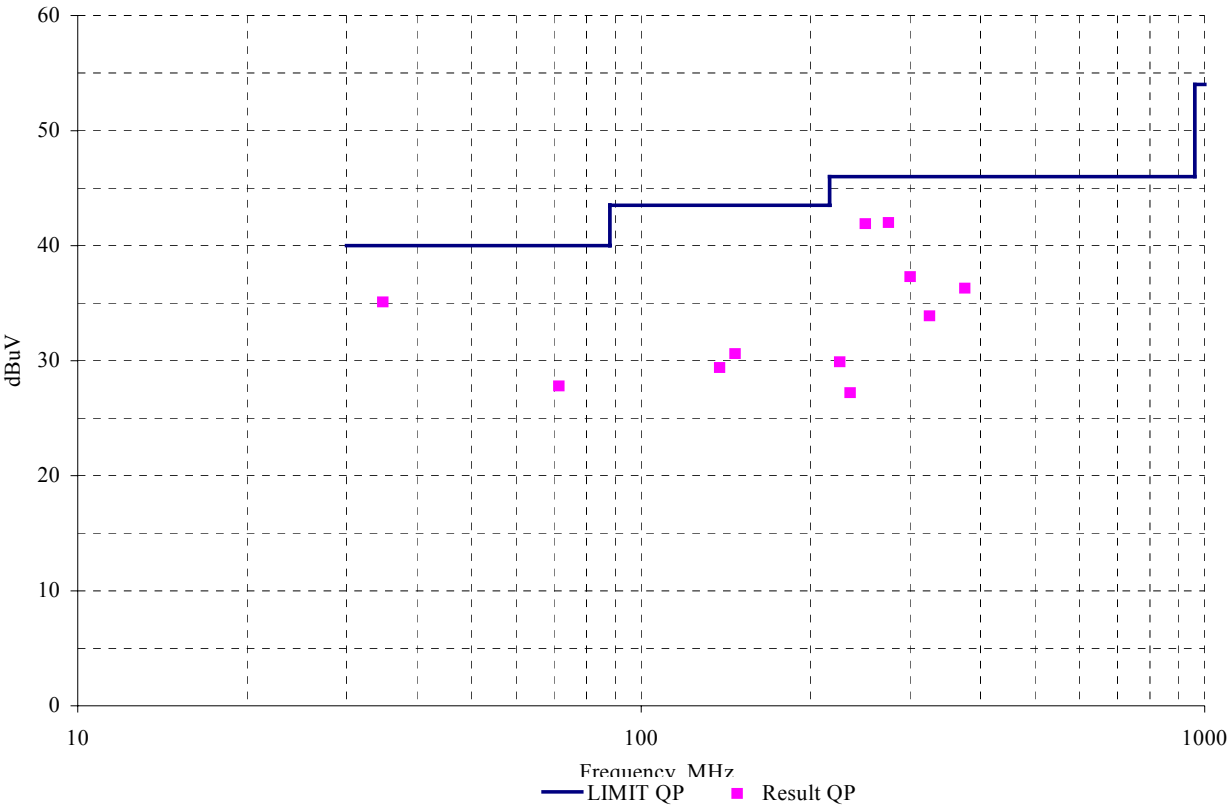


Radiation Test Data

Type : DSP-4284GM
 Manufacturer : Daewoo Electronics Corp.
 Operation mode : Scrolling "H" pattern display 1600 X 1200, 75Hz
 Test distance : 3 m
 Antenna : VULB9160
 Date : Oct. 31, 2002.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
34.8	20.7	13.4	1.0	182	100	V	35.1	40.0	4.9
71.4	16.8	9.4	1.6	62	100	V	27.8	40.0	12.2
137.8	16.0	11.3	2.2	333	105	V	29.4	43.5	14.1
146.8	16.4	11.9	2.3	328	100	V	30.6	43.5	12.9
225.2	18.0	9.1	2.8	285	282	H	29.9	46.0	16.1
234.9	14.6	9.8	2.8	12	324	H	27.2	46.0	18.8
250.0	28.4	10.7	2.8	326	100	V	41.9	46.0	4.1
274.6	27.3	11.7	3.0	260	215	H	42.0	46.0	4.0
300.0	22.3	11.7	3.3	12	289	H	37.3	46.0	8.7
324.8	18.8	11.7	3.4	198	300	H	33.9	46.0	12.1
375.2	20.0	12.5	3.8	276	100	V	36.3	46.0	9.7
449.9	18.5	13.9	4.5	285	100	V	36.9	46.0	9.1
475.1	14.8	14.6	4.8	300	332	H	34.2	46.0	11.9
528.0	14.6	15.6	4.7	0	100	V	34.9	46.0	11.2

MEASUREMENT OF DISTURBANCE RADIATION

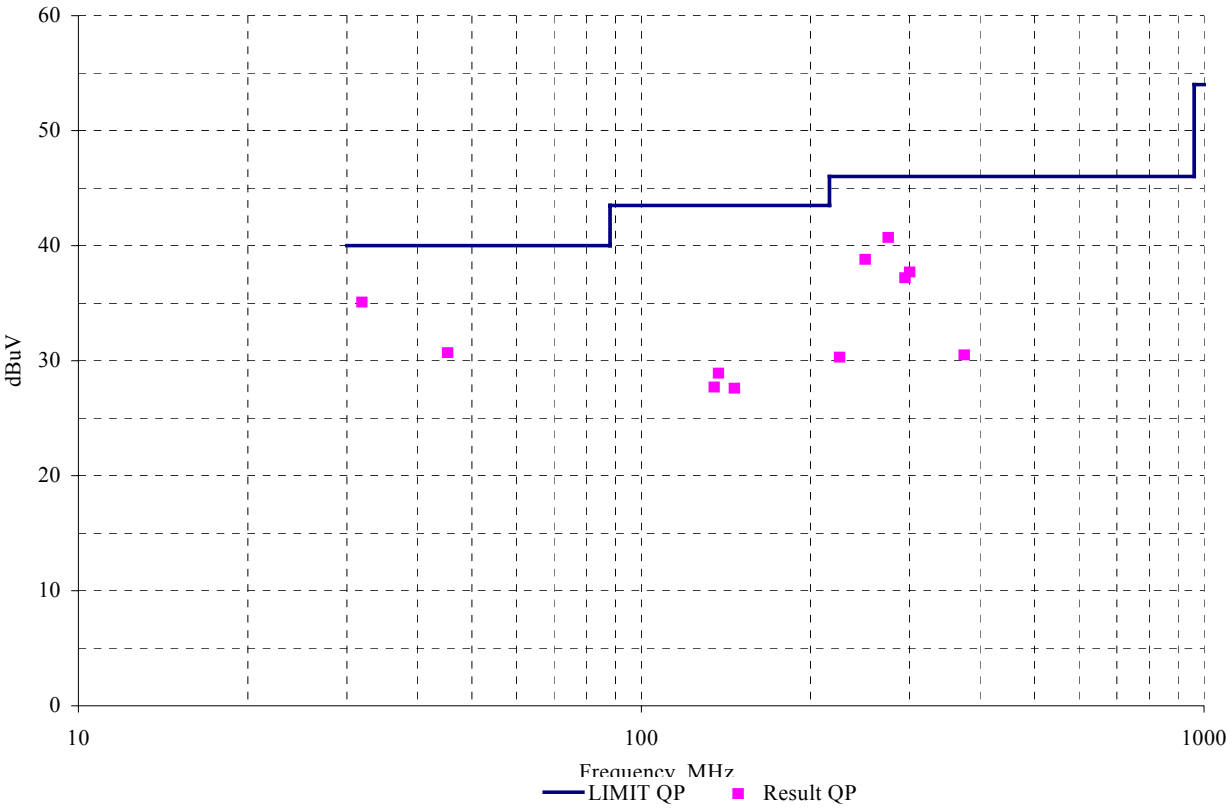


Radiation Test Data

Type : DSP-4284GM
 Manufacturer : Daewoo Electronics Corp.
 Operation mode : Color bar
 Test distance : 3 m
 Antenna : VULB9160
 Date : Oct. 31, 2002.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
31.9	20.8	13.3	1.0	118	100	V	35.1	40.0	4.9
45.3	19.6	9.9	1.2	87	100	V	30.7	40.0	9.3
134.8	14.7	10.9	2.1	216	286	H	27.7	43.5	15.8
137.2	15.6	11.1	2.1	312	212	H	28.9	43.5	14.6
146.5	13.4	11.9	2.3	333	346	H	27.6	43.5	15.9
225.2	18.4	9.1	2.8	342	100	V	30.3	46.0	15.7
249.9	25.3	10.7	2.8	276	275	H	38.8	46.0	7.2
274.7	26.0	11.7	3.0	212	312	H	40.7	46.0	5.3
294.2	22.3	11.8	3.2	156	100	V	37.2	46.0	8.8
300.0	22.8	11.7	3.2	218	345	H	37.7	46.0	8.3
375.1	14.2	12.5	3.8	300	390	H	30.5	46.0	15.5
449.9	18.3	13.9	4.5	276	100	V	36.7	46.0	9.3
474.6	15.2	14.3	4.7	222	100	V	34.1	46.0	11.9
496.9	13.2	14.8	4.8	248	100	V	32.8	46.0	13.2
532.2	12.7	15.6	4.7	290	100	V	33.0	46.0	13.1

MEASUREMENT OF DISTURBANCE RADIATION

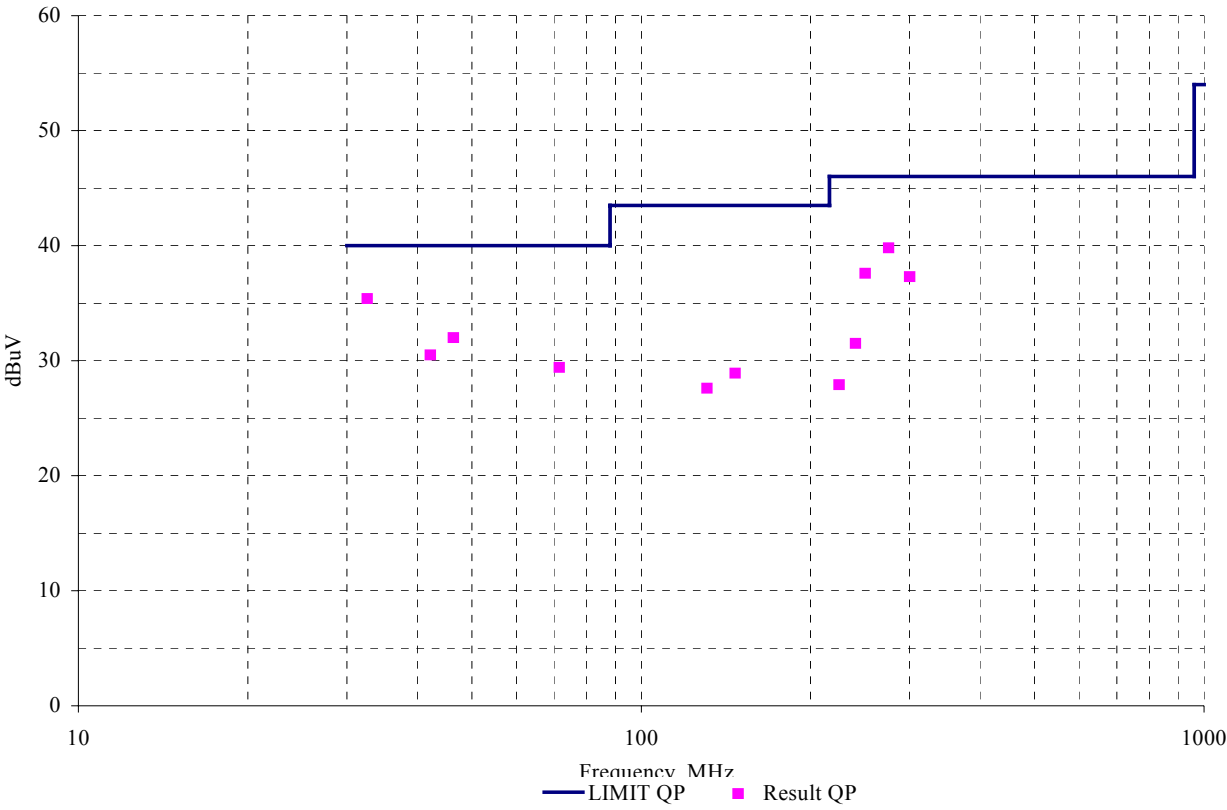


Radiation Test Data

Type : DSP-4284GM
 Manufacturer : Daewoo Electronics Corp.
 Operation mode : DVI "H" Character
 Test distance : 3 m
 Antenna : VULB9160
 Date : Oct. 31, 2002.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
32.6	21.0	13.4	1.0	190	100	V	35.4	40.0	4.6
42.2	16.6	12.7	1.2	44	100	V	30.5	40.0	9.5
46.4	20.7	10.0	1.2	312	100	V	32.0	40.0	8.0
71.5	18.4	9.4	1.6	310	110	V	29.4	40.0	10.6
130.9	15.0	10.5	2.1	286	260	H	27.6	43.5	15.9
146.9	14.7	11.9	2.3	172	100	V	28.9	43.5	14.6
224.7	16.3	8.8	2.8	276	285	H	27.9	46.0	18.1
240.3	18.3	10.3	2.9	318	100	V	31.5	46.0	14.5
249.9	24.1	10.7	2.8	0	100	V	37.6	46.0	8.4
275.2	25.0	11.7	3.1	44	326	H	39.8	46.0	6.2
299.9	22.4	11.7	3.2	288	100	V	37.3	46.0	8.7
375.2	13.6	12.5	3.8	216	333	H	29.9	46.0	16.1
450.1	17.4	14.0	4.5	360	100	V	35.9	46.0	10.1

MEASUREMENT OF DISTURBANCE RADIATION



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 : Oct. 31, 2002

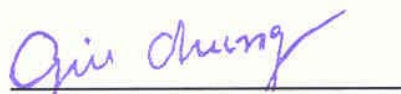
End of testing : Nov. 01, 2002

Reviewed by :



Joon H. Lee / EMC Manager
IST EMC Lab.

Approved by :



G. Chung / Chief of EMC Lab.