Certification of Compliance

CFR 47 Part 15 Subpart B

Test Report File No.	05-IST-0144	**Date of Issue**	March 22, 2005
Model(s)	DF-N71N (DAEWOO)	○ Basic ● Alternated	

Kind of Product	DVD Recorder + VCR
Applicant	Daewoo Electronics Corporation. 543, Dangjung-Dong, Kunpo-City, Kyounggi-DO, Korea
Manufacturer	Daewoo Electronics Corporation. 295, Gondan-dong, Kumi-city, Kyungsangbuk-do, Korea.

Test Result ☒ **Positive** ☐ **Negative**

Reviewed By

S.J.Cho / EMC Group Manager

Approved By

J.H.LEE / Chief

- Investigations requested : Measurement to the relevant clauses of F.C.C rules and regulations Part 15 Subpart B – Unintentional Radiatiors
- The test report with appendix consists of 21 pages.
- The test result only responds to the tested sample.
- It is not allowed to copy this report even partly without the allowance of IST EMC Laboratory.
- This equipment as for has been shown to be capable of continued compliance 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 2003.

TABLE OF CONTENTS

Information of Tuners

Manufacture	**Manufacture Name**
Korea ALPS	TMZH2-030A

Information of Loader

Manufacture	**Manufacture Name**
LITE-ON IT CORP.	DDW-451S

Information of Fan

Manufacture	**Manufacture Name**
XINRVIAN	RDL6015S

INFORMATIONS OF TEST LABORATORY

EMC LABORATORY of IST Co., Ltd. ***(FCC Filing Lab)***
San 21-8, Goan-Ri, Baekam-Myun, Yongin-City
Kyonggi-Do, 449-860, Korea
TEL : +82 31 333 4093 FAX : +82 31 333 4094

ENVIRONMENTAL CONDITIONS

Temperature	14 ℃
Humidity	45 %
Atmospheric pressure	1002 mbar

POWER SUPPLY SYSTEM USED

Power supply system	120Vac , 60Hz

PRODUCT INFORMATIONS

Power requirements	AC 100 - 240 , 50/60Hz
Power consumption	38W
Operating conditions	41°F to 95°F(5°C to 35°C) , 5% to 90%(humidity)
Mass(approx.)	13.5lbs(6.18kg)
Dimensions(approx.)	16.9X3.54X14.0 inches(430X91X354mm) (wXhXd)
Signal system	NTSC
Antenna IN / RF OUT	Antenna or CATV input,75Ω / Channel 3 or 4 (Switchable)
Signal-to-noise ratio	43dB(VCR) , More than 95dB(DVD)
Head system	4 Head Video, 2 Head Hi-Fi helical scan azimuth system
Laser system	Semiconductor laser, wavelength 650mm
Inputs	Video/Audio(RCA jack)
Outputs	Video/Audio(RCA jack), S-video, component(RCA jack)

- EMC suppression device is not used during the test.
- Please refer to user's manual.

INFORMATIONS OF MODEL NAMES

Model Name	Model description	TCB Issued Date	Applied Loader	Applied Tuner
RV4000 SV294 DF-S04 VR2940 VR2945	Basic Model	06/07/2004	BTC	LG, Alps
RV4000 SV294 DF-S04 VR2940 VR2945	Permissive Ⅱ Change (Loader change)	09/02/2004	LITE-ON	LG, Alps
DVR-S04 DF-L71N	Permissive Ⅱ Change (front PCB change)	09/02/2004	BTC	Alps
DVR-S04 DF-L71N	Permissive Ⅱ Change (Front change)	10/20/2004	LITE-ON	Alps
RV4000 SV294 DF-S04 VR2940 VR2945	Permissive Ⅱ Change (Fan add)	11/17/2004	LITE-ON BTC	LG, Alps
DVR-S04 DF-L71N	Permissive Ⅱ Change (Fan add)	11/17/2004	LITE-ON BTC	LG, Alps
DF-N71N	Permissive Ⅱ Change (Power board change)		LITE-ON	Alps

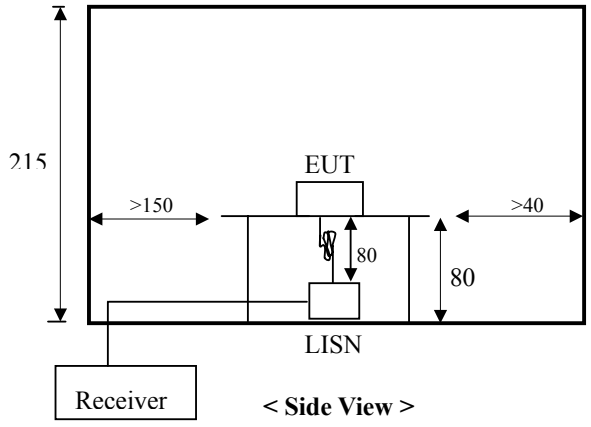
DESCRIPTIONS OF TEST

Conducted Emissions:

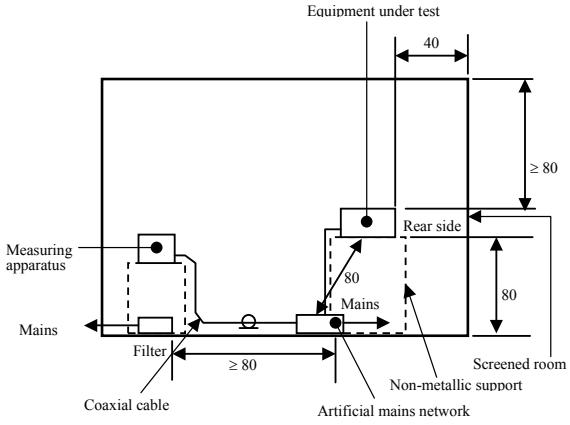
The measurement were performed over the frequency range of 0.15MHz to 30MHz using a 50Ω/50uH LISN as the input transducer to a Spectrum Analyzer or a Field Intensity Meter. The measurements were made with the detector set for "Peak" amplitude within an bandwidth of 10KHz or for "quasi-peak" within a bandwidth of 9KHz.

- Procedure of Test

The line-conducted facility is located inside a shielded room No.1. A 1m X 1.5m wooden table 80cm height is placed 40cm away from the vertical wall and 1.5m away from the other wall of the shielded room. The R/S ESH3-Z5 and EMCO 3825/2 LISN are bonded to bottom of the shielded room. The EUT is located on the wooden table with distance more than 80cm from the LISN and powered from the EMCO LISN .The peripheral equipment is powered from the other LISN. Power to the LISNs are filtered by a noise cut power line filters. All electrical cables are shielded by braided tinned steel tubing with inner ϕ 1.2cm. If the EUT is a DC-powered 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 EMCO LISN. All interconnecting cables more than 1m were shortened by non-inductive bundling to a 1m length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating conditions. The RF output of the LISN was connected to the R/S receiver to determine the frequency producing the maximum emission from the EUT. The frequency producing the maximum level was reexamined using Quasi-Peak mode by manual measurement, after scanned by automatic Peak mode for frequency range from 0.15 to 30MHz. The bandwidth of the receiver was set to 10kHz. The EUT, peripheral equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission.



< Side View >



< Concept Drawing >

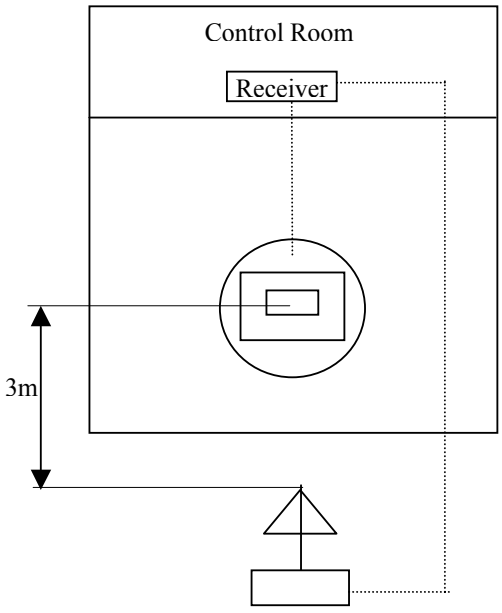
DESCRIPTION OF TEST

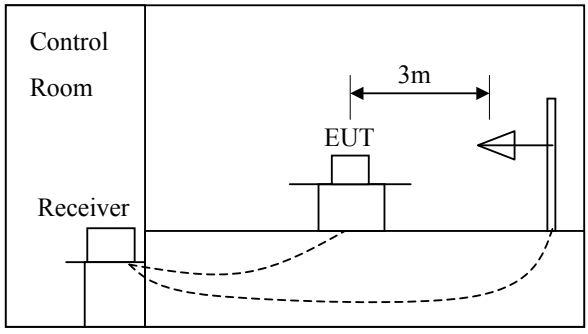
Radiated Emissions:

The measurement was performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120KHz.

- Procedure of Test

Preliminary measurements were made at 3 meter using bi-conical and log-periodic antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 40MHz to 300MHz using S/B bi-conical antenna and 300 to 1000MHz using S/B log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using S/B bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuations. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.





SUMMARY

■ Conducted Emission

The requirements are	● MET	○ Not MET
Minimum limit margin	3.1 dB at 0.537 MHz	
Maximum limit exceeding		

Remarks : With Neutral phase for average detect mode (RF Receiving + VCR Recording)

■ Radiated Emission

The requirements are	● MET	○ Not MET
Minimum limit margin	3.9 dB at 338.9 MHz	
Maximum limit exceeding		

Remarks : At VCR Playback +DVD Recording

☐ Output Signal Level Measurements

The requirements are	○ MET	○ Not MET
Minimum limit margin		
Maximum limit exceeding		

Remarks :

☐ Output Terminal Conducted Spurious Emission

The requirements are	○ MET	○ Not MET
Minimum limit margin		
Maximum limit exceeding		

Remarks :

☐ Transfer Switch Isolation Measurements

The requirements are	○ MET	○ Not MET
Minimum limit margin		
Maximum limit exceeding		

Remarks :

Note :

Prepared By

I.Y.Lee / EMC Engineer

- ■ means the test is applicable, ☐ is not applicable.

TEST CONDITIONS AND DATA

Conducted Emissions

[Applicable]

◆ Test Equipment Used

The test equipment used is calibrated in regular for every year.

Model Name	Manufacturer	Descriptions	Calibration Date	Serial Number
ESH3	Rohde & Schwarz	Test Receiver	July 15, 2004	892108/018
ESH3-Z5	Rohde & Schwarz	LISN	July 15, 2004	862770/025
ESH3-Z2	Rohde & Schwarz	Pulse Limiter	July 15, 2004	357.8810.52
PM5418	FLUKE	Pattern Generator	May 10, 2004	L0796009

◆ Auxiliary Equipment Used

Model Name	Manufacturer	Descriptions
14C5T BLU	Daewoo Electronics.	Color TV Receiver

◆ Accessories including cables

Name	Length	Port and Descriptions
RCA	1m	Audio/Video Out

◆ Environmental Conditions

Temperature	14 ℃
Humidity	47 %
Atmosphere pressure	1004 mbar

◆ Test Program DVD Playback + VCR REC, VCR Playback + DVD REC, RF Receiving + VCR REC, RF Receiving + DVD REC

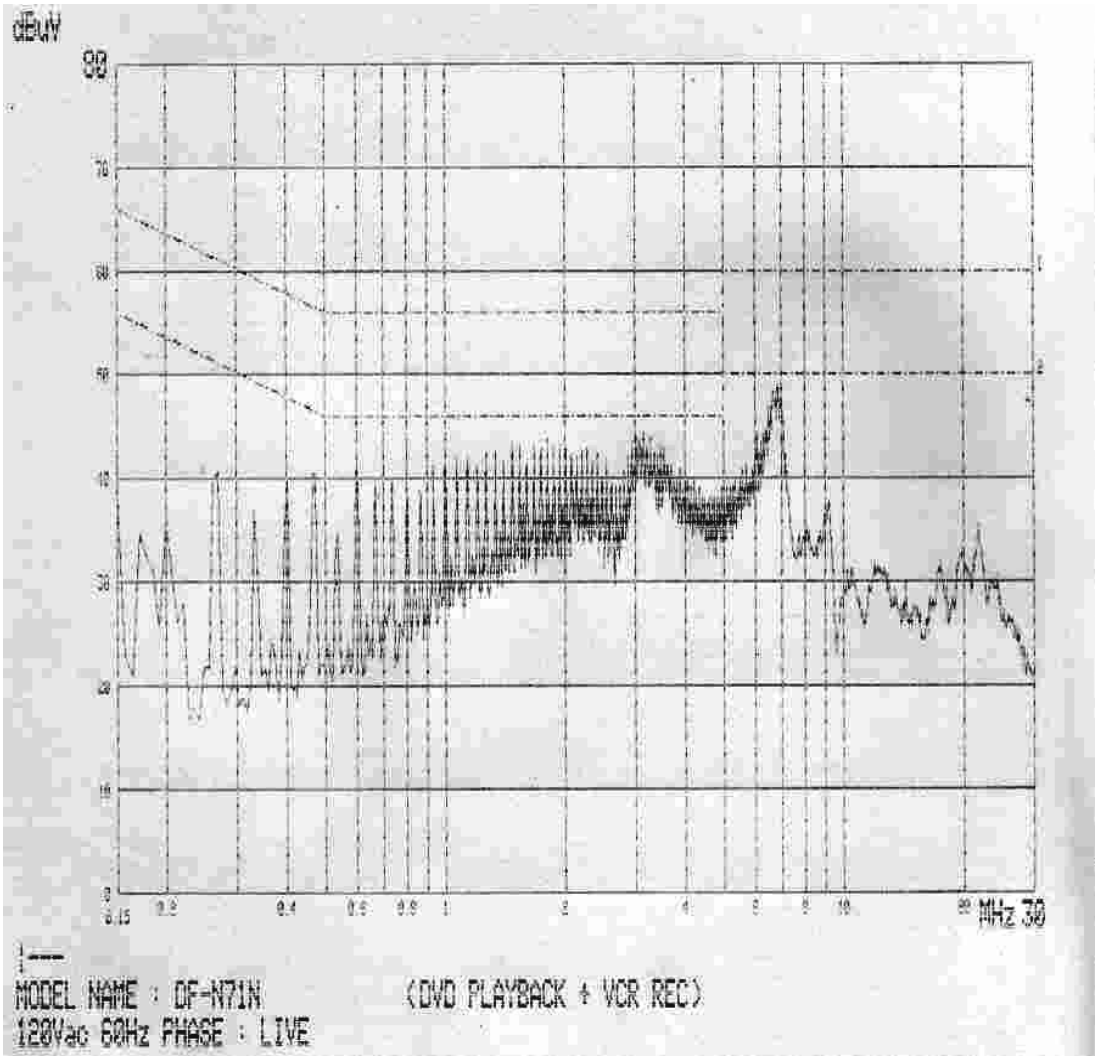
◆ Test Area Conducted Room

◆ Test Date March 15, 2005

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)

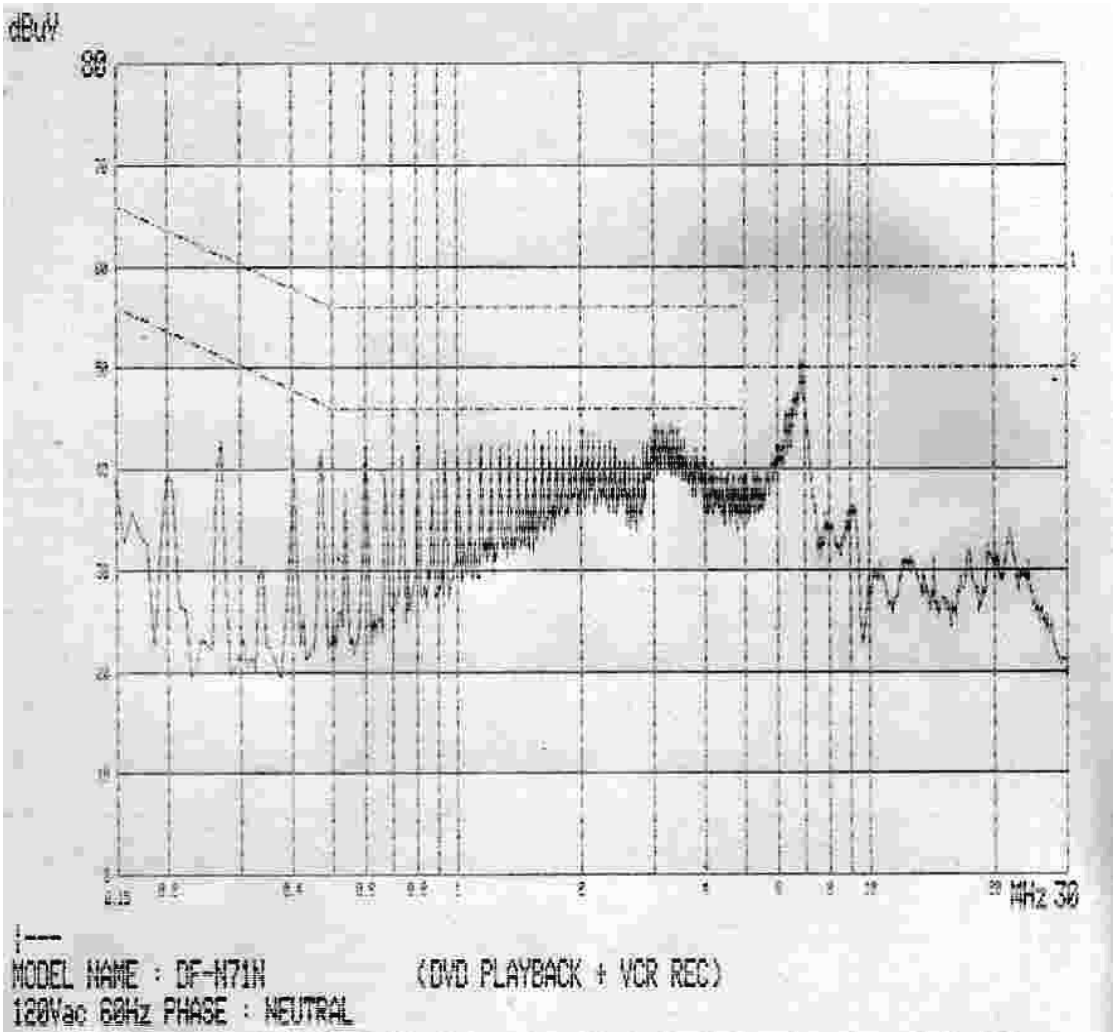


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
1.534	41.7	39.2	56.0	46.0	14.3	6.8
1.868	41.8	39.7	56.0	46.0	14.2	6.3
3.136	42.7	38.7	56.0	46.0	13.3	7.3
6.876	47.3	43.6	60.0	50.0	12.7	6.4

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)

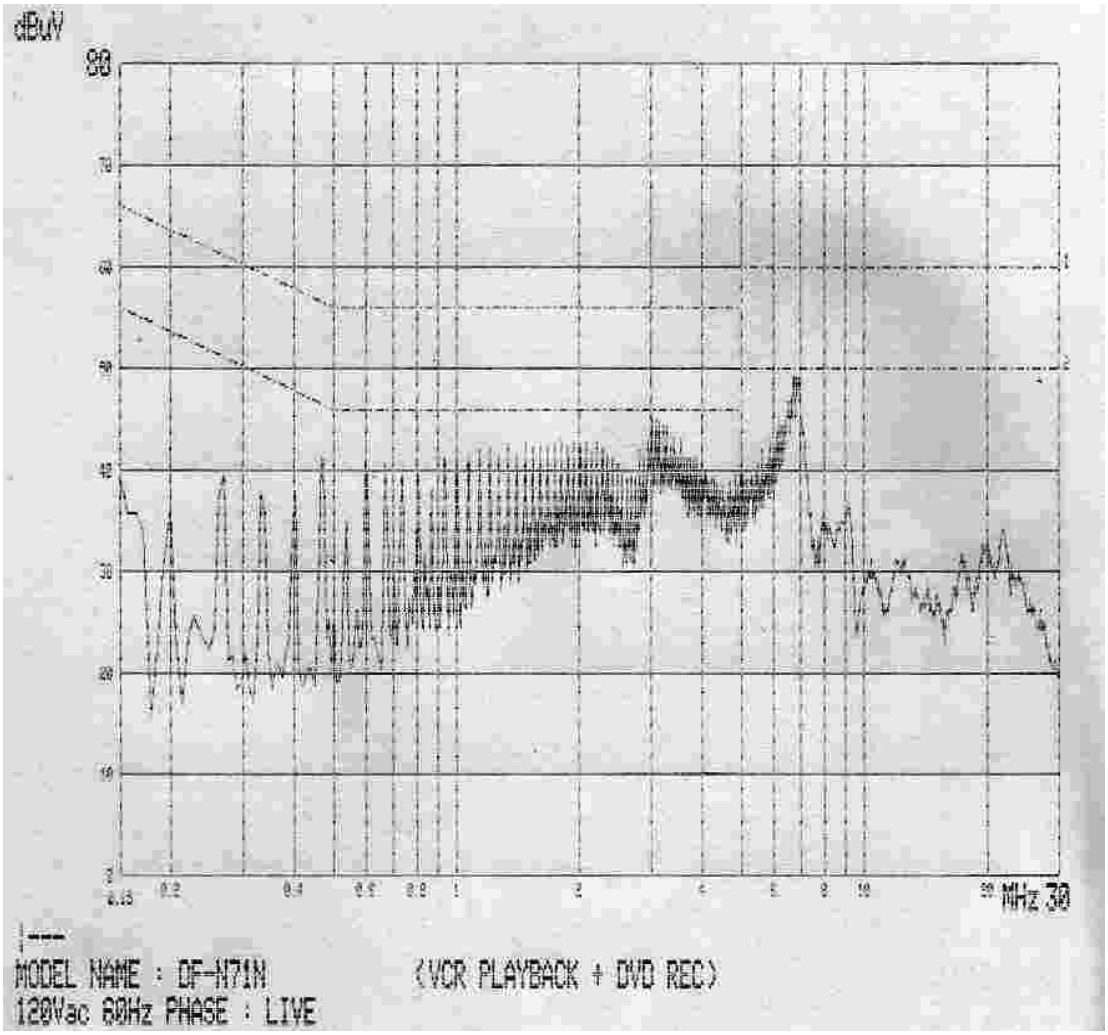


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
1.670	42.7	39.7	56.0	46.0	13.3	6.3
2.072	42.6	40.0	56.0	46.0	13.4	6.0
3.142	43.4	38.9	56.0	46.0	12.6	7.1
6.822	47.7	44.0	60.0	50.0	12.3	6.0

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)

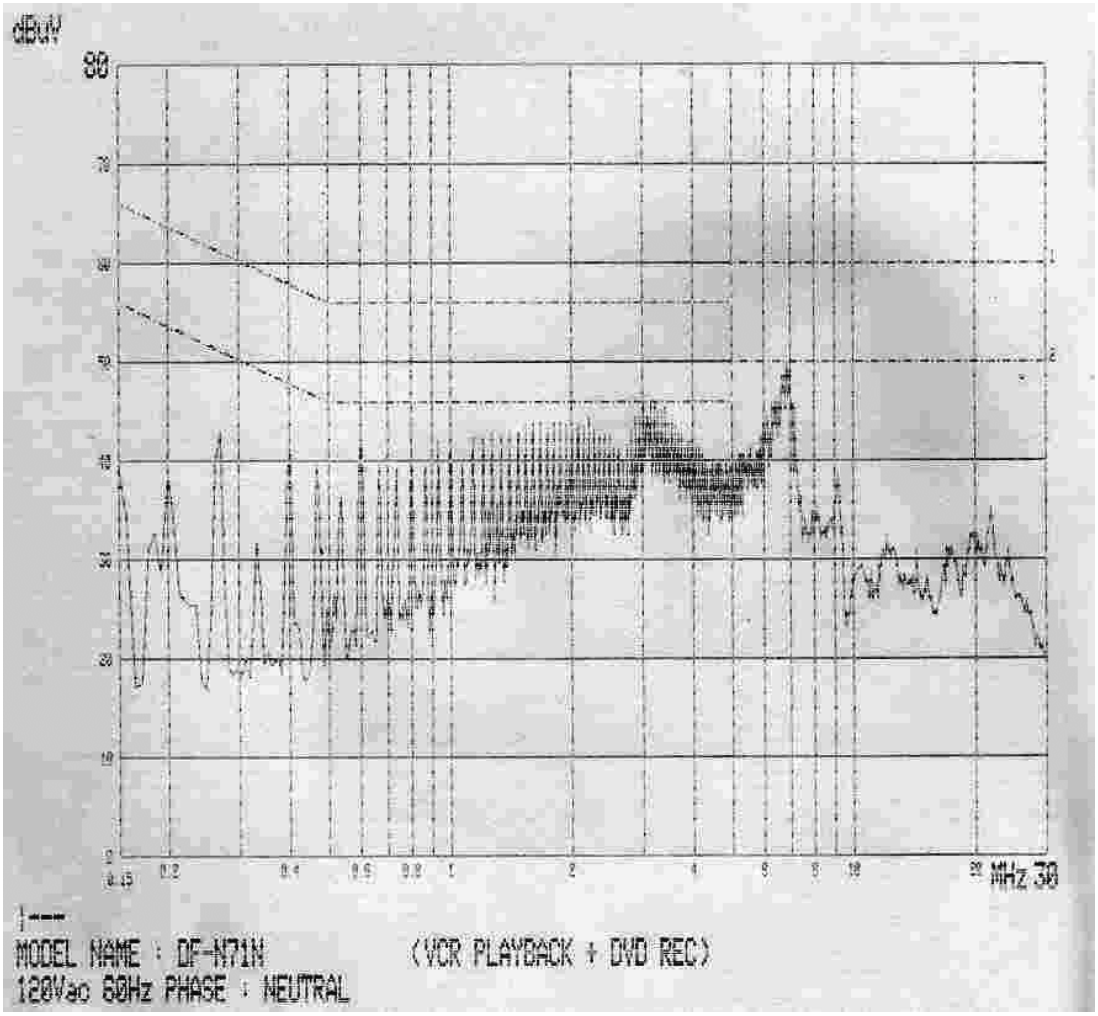


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
1.002	40.9	38.0	56.0	46.0	15.1	8.0
1.537	41.6	38.9	56.0	46.0	14.4	7.1
3.008	42.9	39.1	56.0	46.0	13.1	6.9
6.752	47.0	42.6	60.0	50.0	13.0	7.4

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)

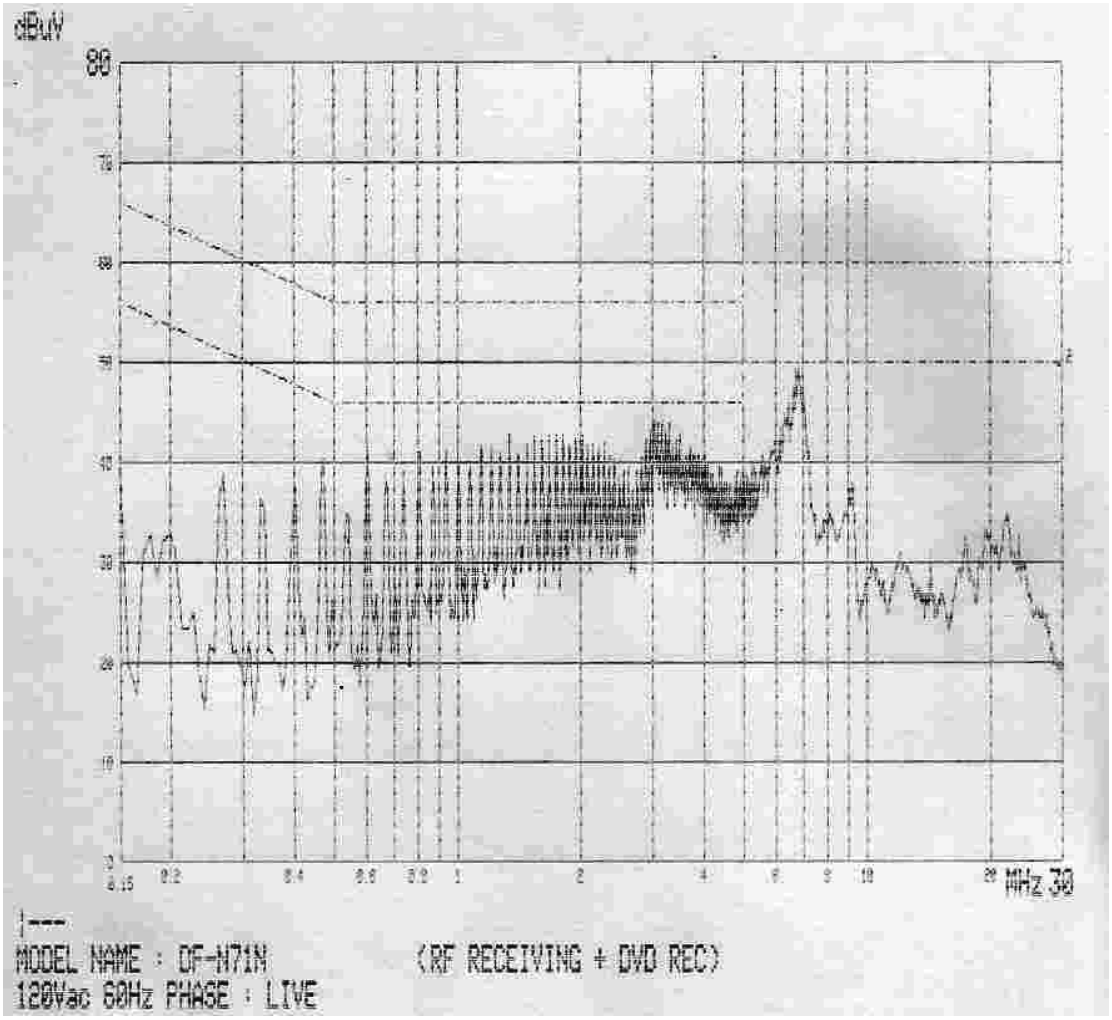


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
1.002	41.3	37.4	56.0	46.0	14.7	8.6
2.205	42.4	39.0	56.0	46.0	13.6	7.0
3.139	43.9	40.4	56.0	46.0	12.1	5.6
6.881	47.3	43.1	60.0	50.0	12.7	6.9

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)

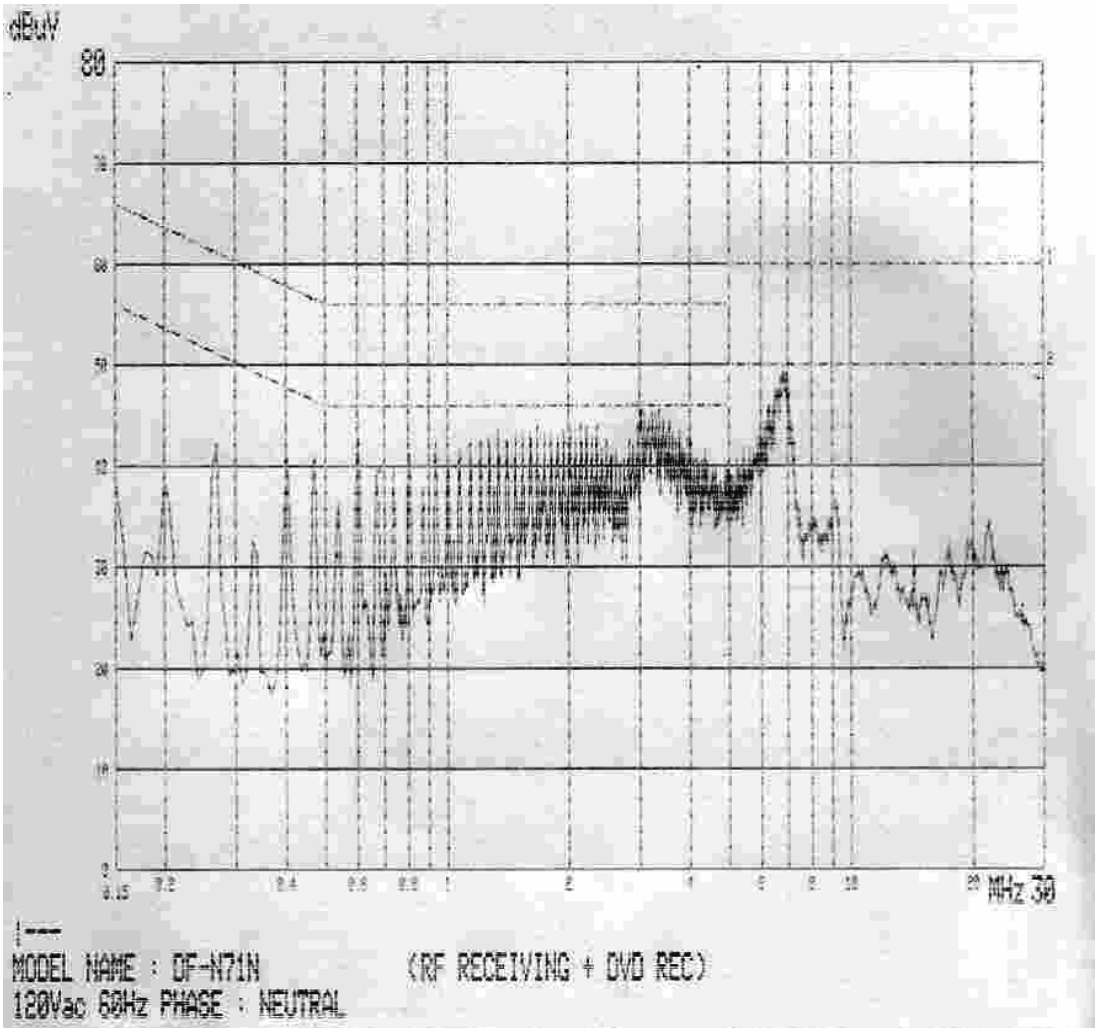


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
0.604	39.8	38.6	56.0	46.0	16.2	7.4
1.341	40.8	38.6	56.0	46.0	15.2	7.4
3.152	42.6	37.7	56.0	46.0	13.4	8.3
6.837	46.7	40.7	60.0	50.0	13.3	9.3

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)

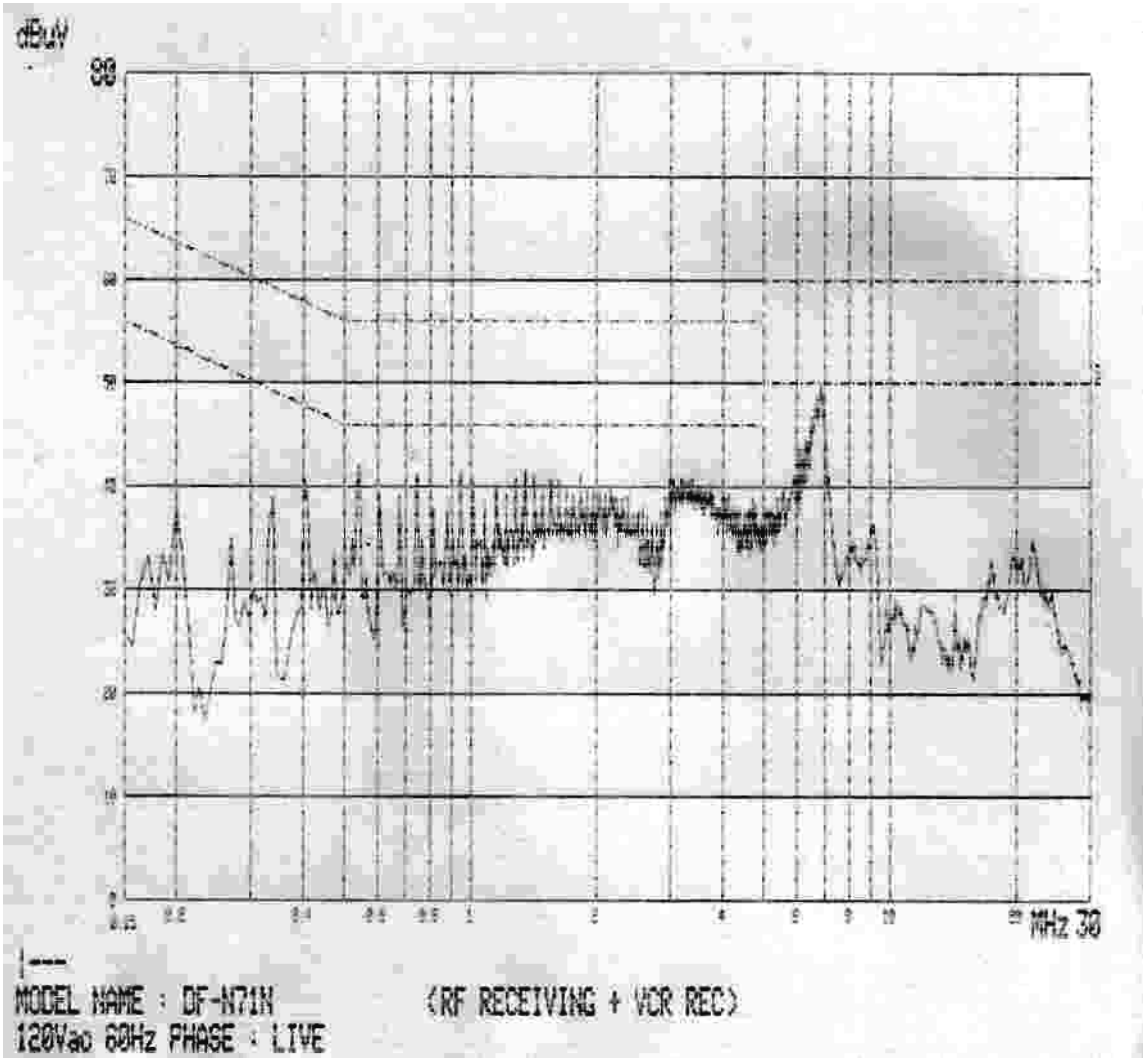


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
1.274	41.5	38.7	56.0	46.0	14.5	7.3
2.146	41.6	38.1	56.0	46.0	14.4	7.9
3.152	43.4	39.1	56.0	46.0	12.6	6.9
6.843	47.4	40.2	60.0	50.0	12.6	9.8

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)

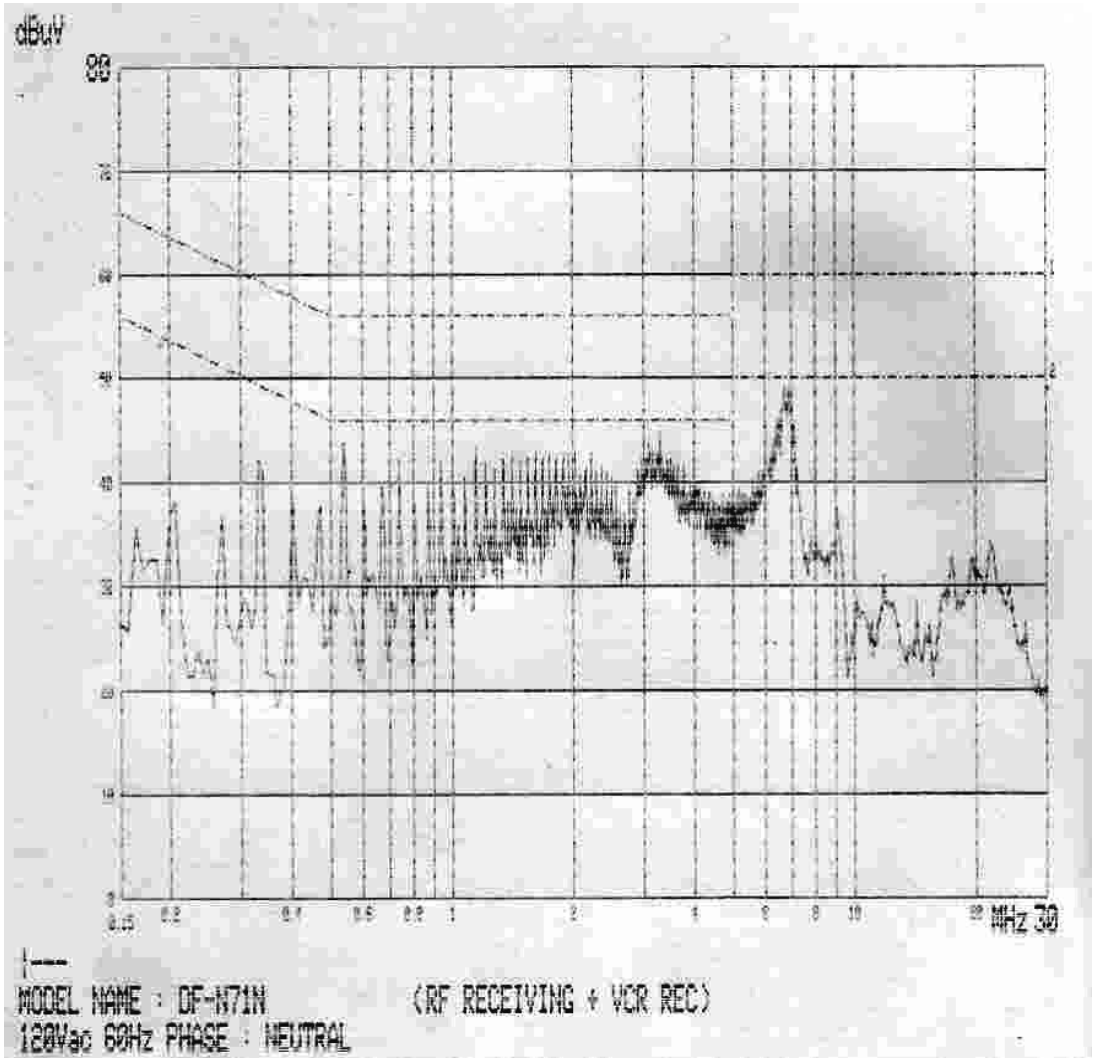


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
0.538	42.1	42.4	56.0	46.0	13.9	3.6
0.739	40.7	41.3	56.0	46.0	15.3	4.7
10.008	40.1	35.8	60.0	50.0	19.9	14.2
6.862	46.7	41.7	60.0	50.0	13.3	8.3

Note :

Conducted Emissions

(Mains Terminal Disturbance Voltages)



Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	Q-peak	Average
0.537	43.1	42.9	56.0	46.0	12.9	3.1
0.738	41.4	41.8	56.0	46.0	14.6	4.2
3.289	41.1	36.8	56.0	46.0	14.9	9.2
6.714	45.7	41.6	60.0	50.0	14.3	8.4

Note :

TEST CONDITIONS AND DATA

Radiated Emissions

[Applicable]

◆ Test Equipment Used

The test equipment used is calibrated in regular for every year.

Model Name	Manufacturer	Descriptions	Calibration Date	Serial Number
ESVP	Rohde & Schwarz	Test Receiver	July 15, 2004	861744/004
VULB9160	Schwarzbeck	Antenna	July 19, 2004	3047
PM5418	FLUKE	Pattern Generator	May 10, 2004	L0796009

◆ Auxiliary Equipment Used

Model Name	Manufacturer	Descriptions
14C5T	Daewoo Electronics.	Color TV Receiver

◆ Accessories including cables

Name	Length	Port and Descriptions
RCA	1.5m	Audio/Video Out

◆ Environmental Conditions

Temperature	10℃
Humidity	47 %
Atmosphere pressure	1004mbar

◆ Test Program — DVD Playback + VCR REC, VCR Playback + DVD REC, RF Receiving + VCR REC, RF Receiving + DVD REC

◆ Test Area — Open Area Test Site #2

◆ Test Date — March 18, 2005

Note :

Radiated Emissions

(Disturbance Radiation)

[Applicable]

System	CH	Freq. (MHz)	Pol. (H/V)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
DVD Playback						
+		58.6	H	31.4	40.0	8.6
VCR record		245.8	H	35.8	46.0	10.2
		245.2	H	34.1	46.0	11.9
		300.0	H	37.2	46.0	8.8
		338.8	H	40.1	46.0	5.9
VCR Playback		58.5	H	31.0	40.0	9.0
+		245.8	H	35.5	46.0	10.5
DVD record		254.2	H	29.4	46.0	16.6
		300.0	H	33.9	46.0	12.1
		338.9	H	42.1	46.0	3.9
		474.4	H	34.5	46.0	11.5
RF Receiving		58.6	H	31.3	40.0	8.7
+		245.8	H	35.1	46.0	10.9
VCR record		245.1	H	27.4	46.0	18.6
		300.0	H	31.7	46.0	14.3
		338.8	H	42.0	46.0	4.0
		474.4	H	34.1	46.0	11.9
RF Receiving		58.5	H	31.4	40.0	8.6
+		245.8	H	35.6	46.0	10.4
DVD record		254.2	H	30.2	46.0	15.8
		300.0	H	31.9	46.0	14.1
		338.8	H	40.7	46.0	5.3
		474.4	H	34.7	46.0	11.3

Note :

The DUT photos

Front View

Rear View

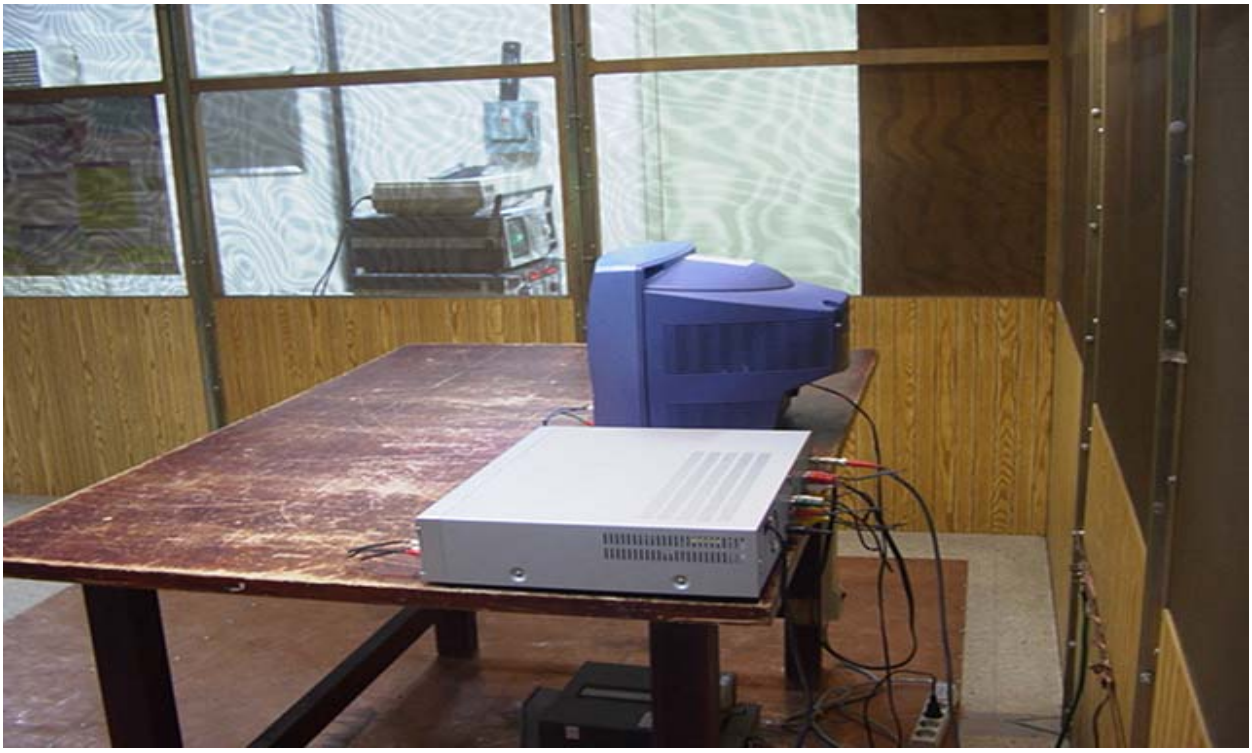
Test Setup Photos – Radiated Emissions

Front View

Rear View

Test Setup Photos – Conducted Emissions

Front View



Rear View