IST EMC LAB.

E M I S S I O N T E S T R E P O R T

Test report file No. : **03-IST-306/FB** Date of issue : Nov. 26, 2003

Model / Type No. : G-combo plus ■ Basic □ Alternate

Kind of product : VGA Converter

Brand name : CSE

Applicant : CSE CO., LTD.

Manufacturer : CSE CO., LTD.

License holder : CSE CO., LTD.

Address : 18F, Daeshin Life Insurance B/D, #395-68, Shindaebang-Dong, Dongjak-Gu, Seoul, Korea

Test result according to the regulation(s)

■ Positive □ Negative

at page 3.

This test report with appendix consists of 22 pages. The test result only responds to the tested sample.
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.

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DIRECTORY

A) Documentation.

B) Test Data.

C) Appendix

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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.
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EQUIPMENT UNDER TEST

Equipment Description :

Specifications :	Plug & Play Input spec : Composite, S-Video or color difference (YpbPr) inputs Input : Component, Composite and S-Video input, RCA and Phone Jack audio input, VGA input Input Frequency HS : 15.75kHz, VS : 60Hz Output spec : Analog RGB Output : Monitor output, Earphone jack output Output Frequency HS : 31.5kHz
Features :	Mode changeable “PC or Game” by slide switching Compatibility with any PC and VGA monitor USB power source(No need for any adaptor)
Dimension :	140(W) X 30(H) X 90(D) mm
Power Consumption :	2.5 W

EQUIPMENT UNDER TEST

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 : 1) PC Conversion Mode 2) Game Conversion Mode

Configuration of the equipment under test :

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

Equipment	Type	Brand	Serial No.
PC	Vectra VL420MT	HP	SG23101784
Keyboard	SK-2502C	HP	M020321066
PS/2 Mouse	M-S48a	HP	LZC20602926
Serial Mouse	M-S428	Logitech	LCA53305547
Printer	A0302384	Northern Telecom	26633S60168
Monitor	103F	Daewoo	Unknown
Play Station2	SCPH-30005 R	SONY	M0449446
Analog Controller	SCPH-10010	SONY	Unknown

Connecting Interface Cables :
- Unshielded AC power cable : 1.8 m
- Unshielded USB power cable(with one ferrite core) : 1.2 m
- Shielded monitor's signal cable (with two ferrite core) : 1.5 m
- Shielded Personal Computer's signal cable (with two ferrite core) : 1.5 m
- Shielded printer's signal cable (with two ferrite core) : 1.8 m
- Unshielded RCA cable : 1.5 m
- Unshielded Audio I/O cable : 1.5 m
- Unshielded S-Video cable : 1.5 m

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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. 22, 2003	892108/018
3725/2	LISN	EMCO	Jul. 23, 2003	9101-2068
KNW-407	LISN	Hyup-Rip	Jul. 23, 2003	8-883-10
ESH 3-Z2	Pulse Limiter	Rohde & Schwarz	Jul. 23, 2003	357.8810.52

Test - accessories :

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

Measurement Procedures :

Conducted emissions measurments 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 0.15MHz 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. M. Kim / Research Engineer
IST EMC Lab.

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TEST CONDITIONS

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	Jul. 22, 2003	861744/004
VULB 9160	Antenna	Schwarzbeck	Jul. 09, 2003	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. M. Kim / Research Engineer
IST EMC Lab.

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TEST RESULT

Conducted emissions : 150 kHz - 30 MHz

The requirements are.

☒ KEPT ☐ NOT KEPT

Min. limit margin

PC Conversion Mode : 15.5 dB at 19.468 MHz

Game Conversion Mode : 12.5 dB at 0.226 MHz

Remarks : See test-data at pages 13 ~ 15, 18 ~ 20.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are.

☒ KEPT ☐ NOT KEPT

Min. limit margin

PC Conversion Mode : 3.5 dB at 66.4 MHz

Game Conversion Mode : 3.4 dB at 185.2 MHz

Remarks : See test-data at page 16 ~ 17, 21 ~ 22.

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Measurement Uncertainty Calculation

The measurement uncertainties stated were calculated in accordance with the requirements of NIST Technical Note 1297 and NIS 81 (1994).

Contribution (Conducted Emissions)	Probability Distribution	Uncertainty (±dB) 0.15-30MHz
Receiver Specification	Rectangular	1.5
LISN Coupling Specification	Rectangular	1.5
Cable and Input Attenuator Calibration	Normal (k=2)	0.5
Mismatch to Reciver	U-Shaped	-0.8 / +0.7
System Repeatability	Normal (k=1)	0.2
Combined Standard Uncertainty	Normal (k=2)	-1.85 / +1.71
Expanded Uncertainty U	Normal (k=2)	-3.7 / +3.42

$U_{c,\min\ us}$ = -1.85, $U_{c,plus}$ = 1.71

U = -3.70 / +3.42 (k=2, 95.45% confidence level)

Contribution (Radiated Emissions)	Probability Distribution	Uncertainties(±dB) 3 m
Antenna		
Factor	Normal (k=2)	0.9968
Frequency Interpolation	Rectangular	0.1039
Height Variation	Rectangular	-2.6 / +1.5
Directivity Difference	Rectangular	-1.0 / +0
Phase Center Location	Rectangular	1.0
Cable Loss	Normal (k=2)	0.5
Receiver		
Voltage Accuracy	Normal (k=2)	2.0
Pulse Response	Rectangular	1.5
Absolute Repetition Rate	Rectangular	1.5
Mismatch to Receiver $\lvert \Gamma_{antenna} \rvert = 0.33$ $\lvert \Gamma_{receiver} \rvert = 0.33$	U-Shaped	-1.0 / +0.9
System Repeatibility	Std Deviation	0.5
Combined Standard Uncertainty	Normal	-2.6048 / 2.2775
Expanded Uncertainty U	Normal (k=2)	-5.21 / +4.55

$U_{c,\min\ us}$ = -2.6048, $U_{c,plus}$ = 2.2775

U = -5.21 / +4.55 (k=2, 95.45% confidence level)

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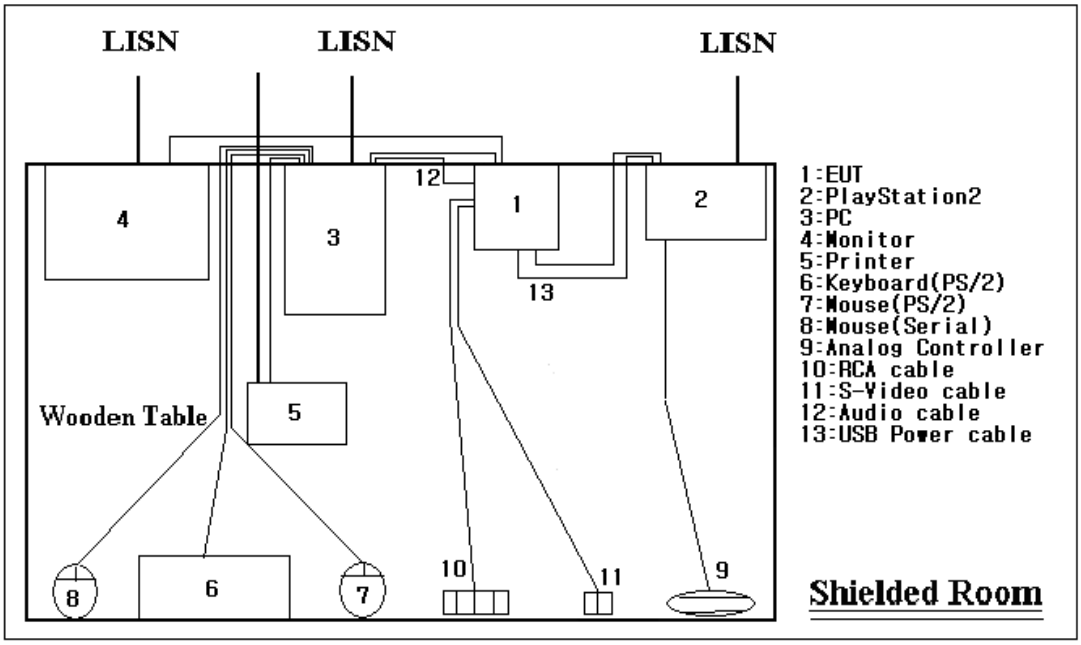
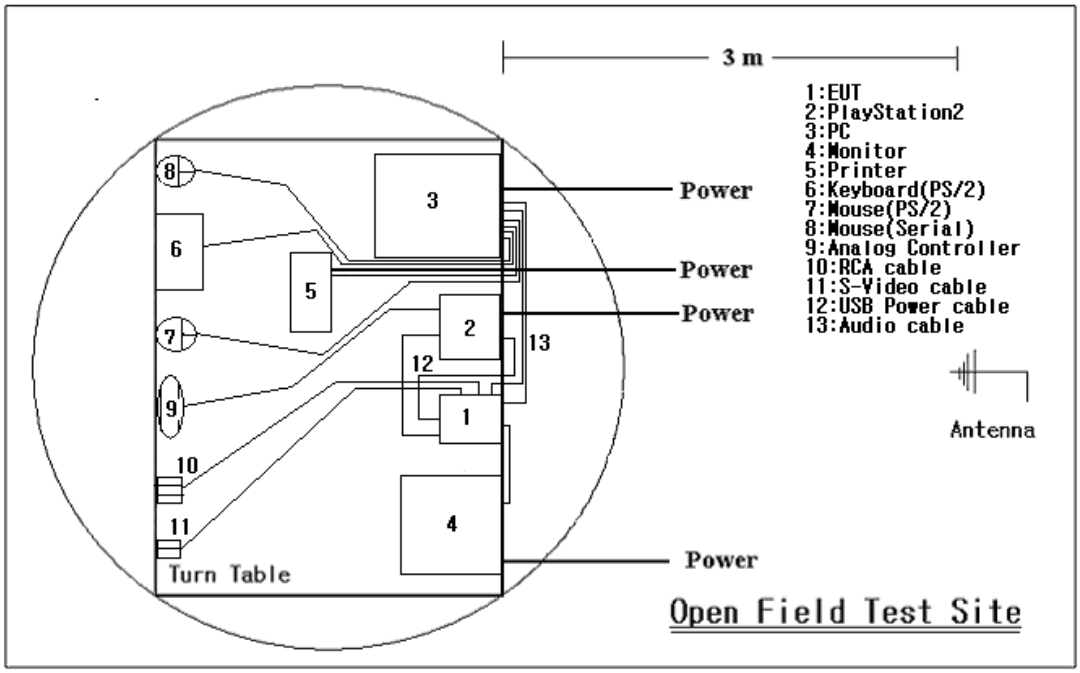
TEST SETUP (Drawings)

Type : G-combo plus



Conducted Emissions 150kHz - 30 MHz



Radiated Emissions 30 MHz - 1000 MHz

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TEST SETUP (Photos)

Type : G-combo plus

Conducted Emissions 150kHz - 30 MHz

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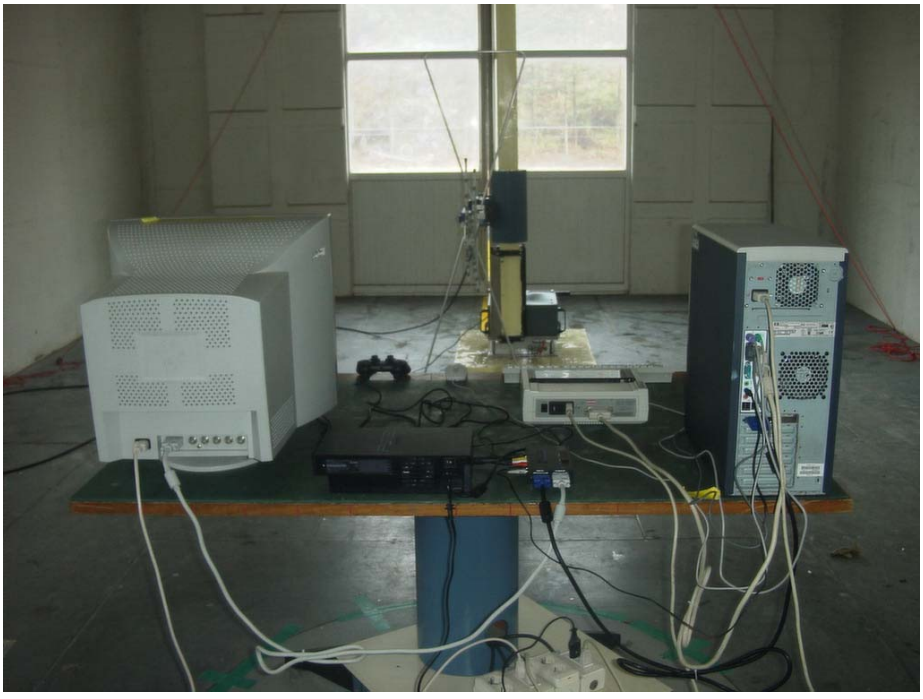
TEST SETUP (Photos)

Type : G-combo plus

Radiated Emissions 30MHz - 1000 MHz



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Conducted Emission Test Data

Type	G-combo plus		
Manufacturer	CSE CO., LTD.		
Operation mode	PC Conversion Mode		
Environmental Conditon	Temperature	:	20.1 °C
	Humidity	:	46 %
	Atmospheric pressure	:	1014 mbar
Date	Nov. 25, 2003		

Highest Emissions ralative to the limit

Frequency [MHz]	Reading [dBμV]		Phase	Insertion Loss (LISN)	Limit [dBμV]		Margin [dB]	
	Q-peak	AV			Q-peak	AV	Q-peak	AV
0.150	25.8	7.5	L1	0.8	66.0	56.0	39.4	47.7
0.341	30.6	29.5		0.8	59.2	49.2	27.8	18.9
0.809	16.2	13.1		0.8	56.0	46.0	39.0	32.1
3.967	15.4	10.6		0.8	56.0	46.0	39.8	34.6
19.468	39.8	33.7		0.8	60.0	50.0	19.4	15.5
25.941	32.9	28.3		0.8	60.0	50.0	26.3	20.9
0.150	25.5	8.7	N	0.8	66.0	56.0	39.7	46.5
0.341	28.4	28.1		0.8	59.2	49.2	30.0	20.3
0.666	16.6	13.8		0.8	56.0	46.0	38.6	31.4
4.669	16.1	11.3		0.8	56.0	46.0	39.1	33.9
19.468	39.8	33.7		0.8	60.0	50.0	19.4	15.5
25.958	32.4	24.0		0.8	60.0	50.0	26.8	25.2
Cable loss are less than 0.1 dB								

*L1 : Live Line
**N : Neutral Line
*** **Please refer to data graphs at page 14 ~ 15.**

Coverage factor of k=2 will ensure that the level of confidence will be approximately 95.45%,
Uncertainty U = -3.70 / +3.42 [dB]

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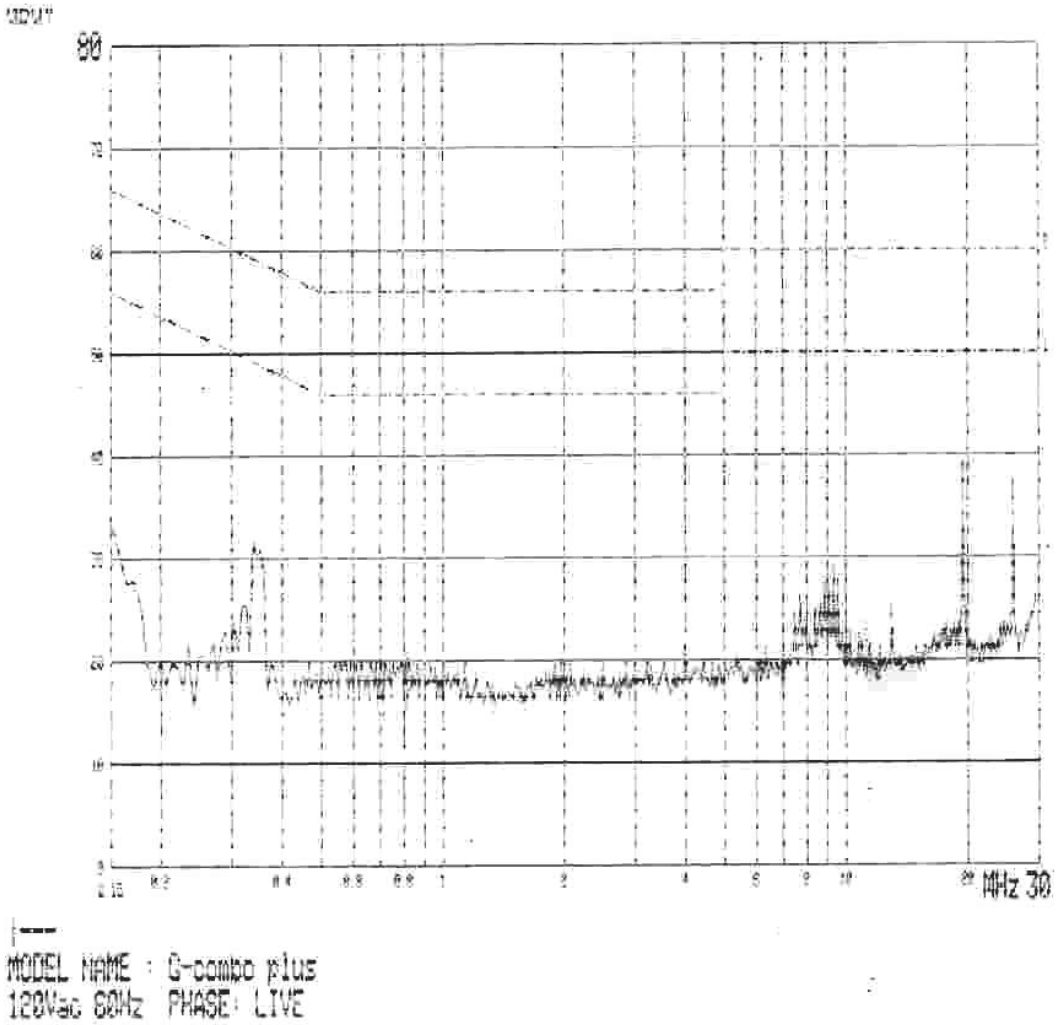

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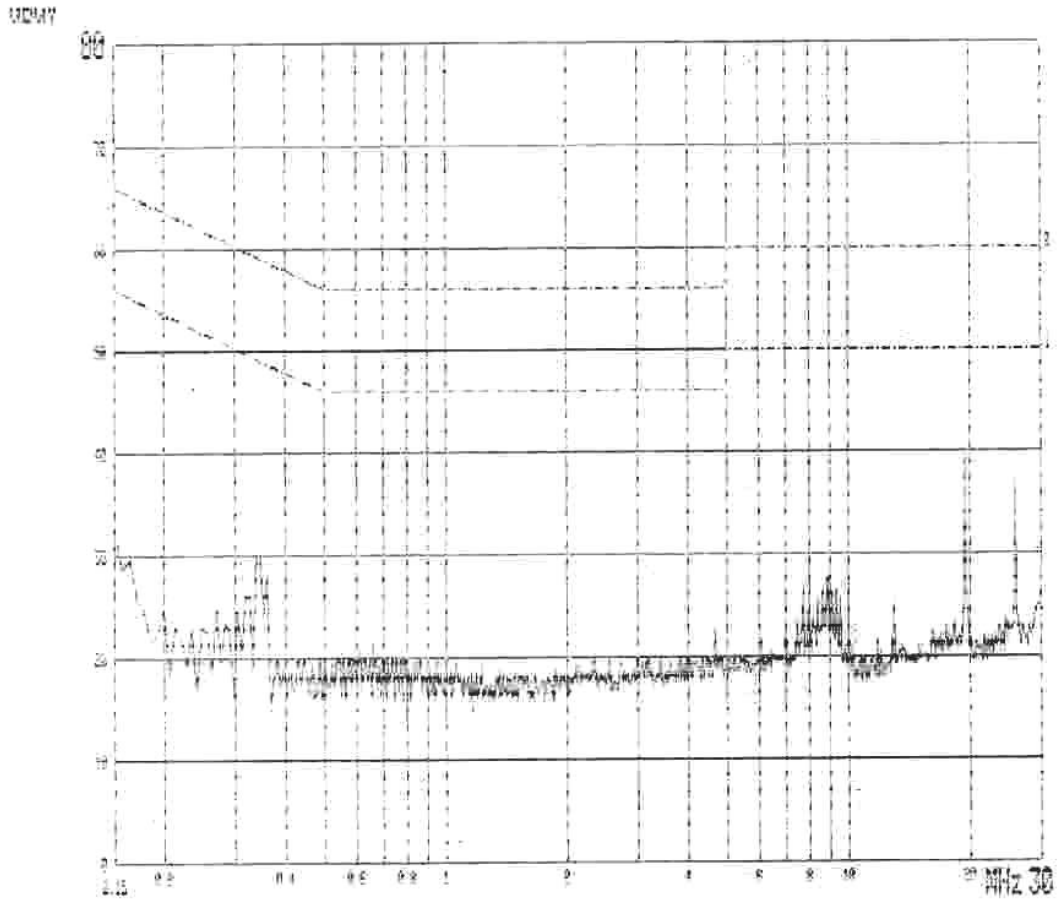

MODEL NAME : G-combo plus
120Vac 60Hz PHASE: NEUTRAL

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Radiation Test Data

Type	G-combo plus		
Manufacturer	CSE CO., LTD.		
Operation mode	PC Conversion Mode		
Environmental Conditon	Temperature	:	16.8 °C
	Humidity	:	48 %
	Atmospheric pressure	:	1014 mbar
Test distance	3 m		
Antenna	VULB9160		
Date	Nov. 21, 2003		

Highest Emissions ralative to the limit

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
56.8	14.3	11.0	1.3	81	100	V	26.6	40.0	13.4
66.4	24.8	10.2	1.5	145	100	V	36.5	40.0	3.5
75.8	23.6	8.6	1.6	192	100	V	33.8	40.0	6.2
113.8	25.4	9.5	1.9	165	105	V	36.8	43.5	6.7
151.8	18.5	12.1	2.3	151	100	V	32.9	43.5	10.6
161.2	22.6	12.3	2.3	220	100	V	37.2	43.5	6.3
170.8	13.8	12.3	2.4	163	102	V	28.5	43.5	15.0
208.6	12.9	8.3	2.5	10	100	V	23.7	43.5	19.8
218.2	13.6	8.4	2.7	296	293	H	24.7	46.0	21.3
255.4	24.2	11.0	2.8	205	289	H	38.0	46.0	8.0
302.4	18.6	11.7	3.3	336	120	V	33.6	46.0	12.4
359.4	12.3	11.7	3.6	338	300	H	27.6	46.0	18.4
501.0	11.8	15.1	4.8	253	302	H	31.7	46.0	14.3

Coverage factor of k=2 will ensure that the level of confidence will be approximately 95.45%,
Uncertainty U = -5.21 / +4.55 [dB]

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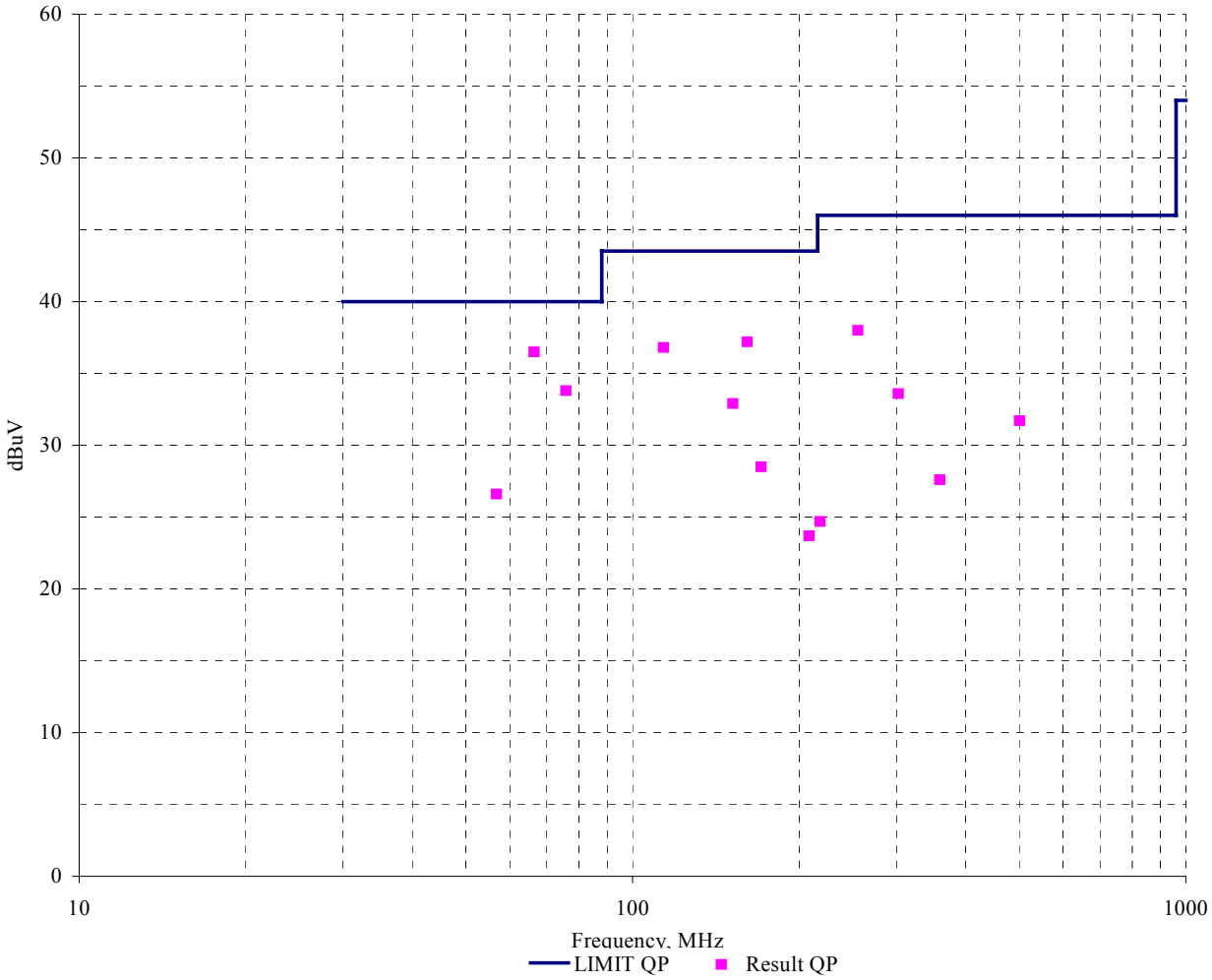
MEASUREMENT OF DISTURBANCE RADIATION



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Conducted Emission Test Data

Type	G-combo plus		
Manufacturer	CSE CO., LTD.		
Operation mode	Game Conversion Mode		
Environmental Conditon	Temperature	:	20.1 ℃
	Humidity	:	46 %
	Atmospheric pressure	:	1014 mbar
Date	Nov. 23, 2003		

Highest Emissions ralative to the limit

Frequency [MHz]	Reading [dBμV]		Phase	Insertion Loss (LISN)	Limit [dBμV]		Margin [dB]	
	Q-peak	AV			Q-peak	AV	Q-peak	AV
0.150	40.9	8.9	L1	0.8	66.0	56.0	24.3	46.3
0.282	33.4	32.9		0.8	60.8	50.8	26.6	17.1
1.522	23.6	20.3		0.8	56.0	46.0	31.6	24.9
2.370	30.1	24.8		0.8	56.0	46.0	25.1	20.4
8.917	30.7	21.2		0.8	60.0	50.0	28.5	28.0
26.990	37.0	36.5		0.8	60.0	50.0	22.2	12.7
0.150	39.0	9.4	N	0.8	66.0	56.0	26.2	45.8
0.226	40.6	39.3		0.8	62.6	52.6	21.2	12.5
0.621	29.3	26.6		0.8	56.0	46.0	25.9	18.6
2.315	28.1	24.6		0.8	56.0	46.0	27.1	20.6
8.699	30.6	22.4		0.8	60.0	50.0	28.6	26.8
26.990	36.3	35.8		0.8	60.0	50.0	22.9	13.4
Cable loss are less than 0.1 dB								

*L1 : Live Line
**N : Neutral Line
*** **Please refer to data graphs at page 19 ~ 20.**

Coverage factor of k=2 will ensure that the level of confidence will be approximately 95.45%,
Uncertainty U = -3.70 / +3.42 [dB]

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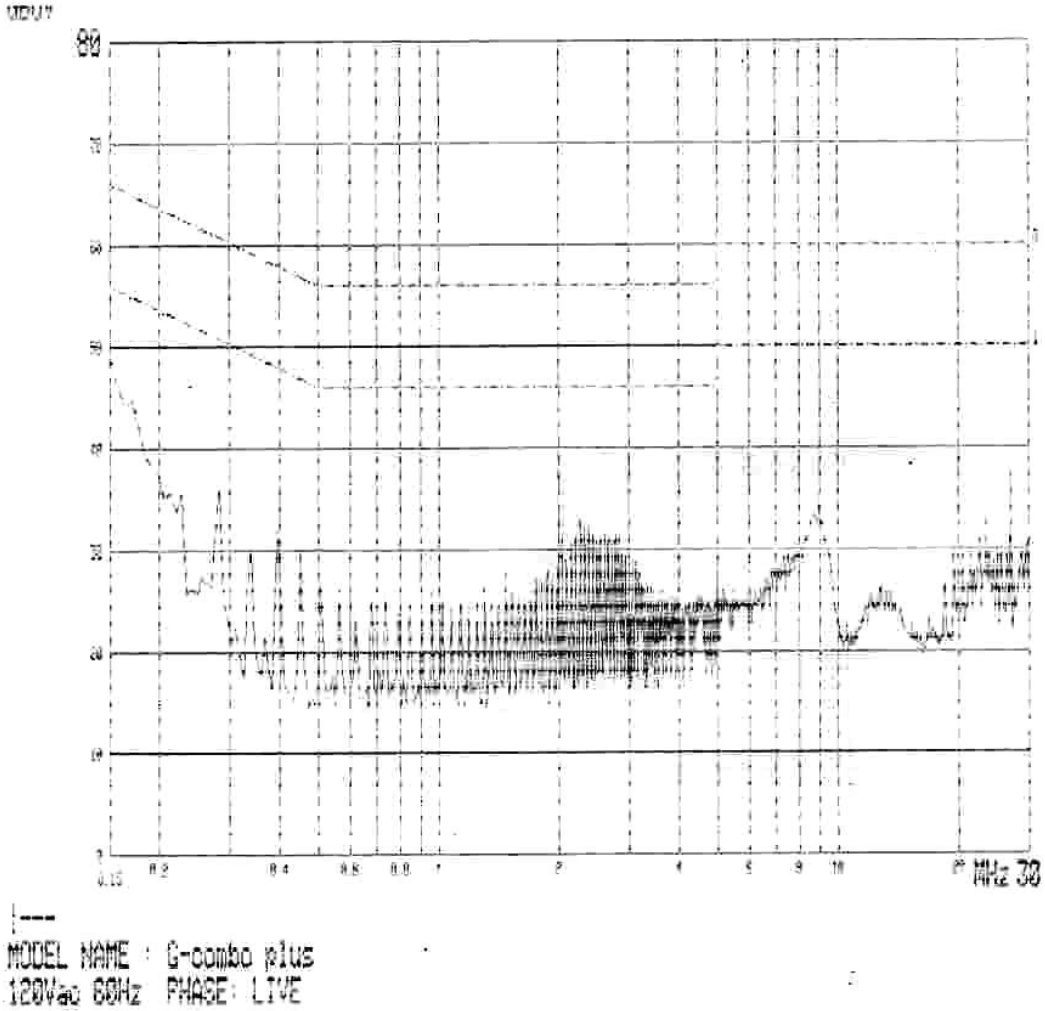

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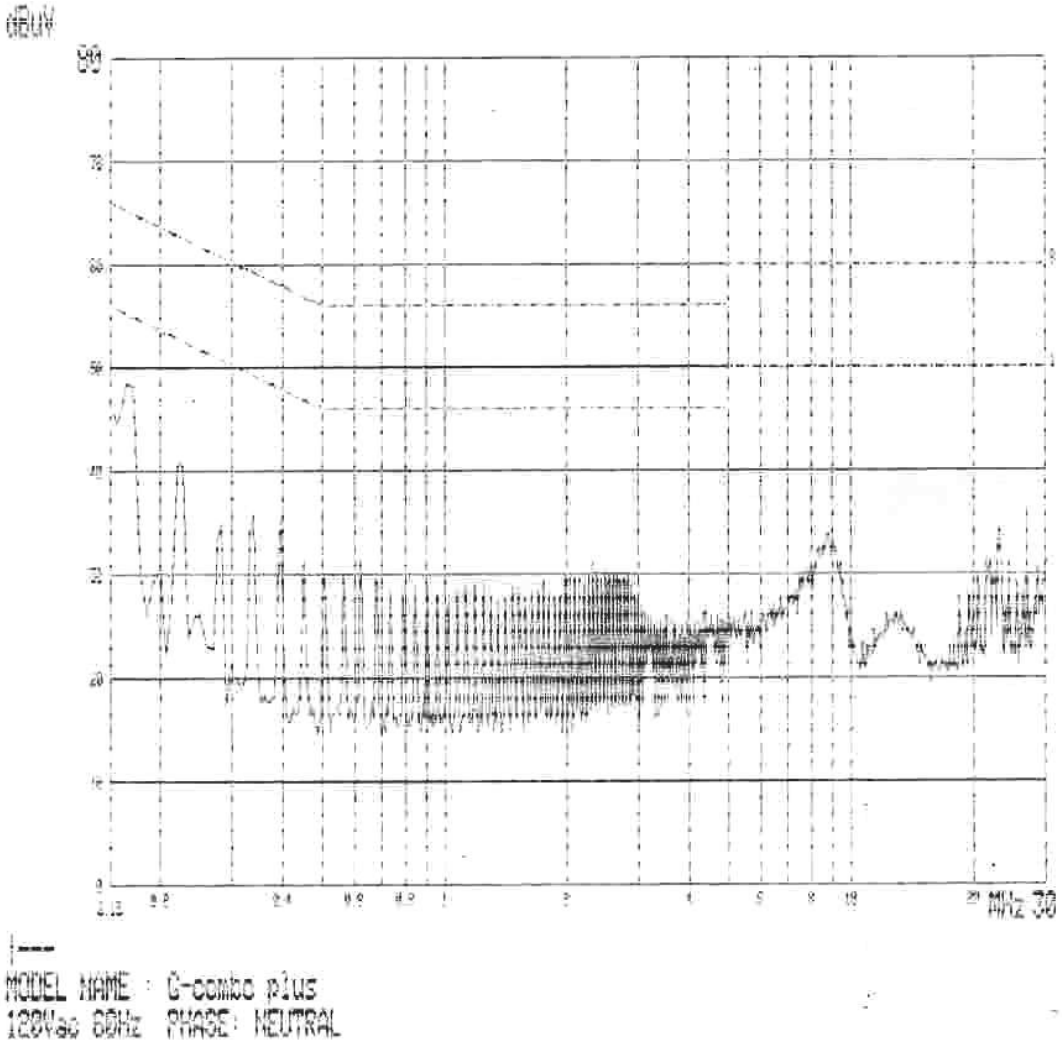

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Radiation Test Data

Type	G-combo plus		
Manufacturer	CSE CO., LTD.		
Operation mode	Game Conversion Mode		
Environmental Conditon	Temperature	:	16.8 °C
	Humidity	:	48 %
	Atmospheric pressure	:	1014 mbar
Test distance	3 m		
Antenna	VULB9160		
Date	Nov. 21, 2003		

Highest Emissions ralative to the limit

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
49.6	18.7	10.4	1.2	189	100	V	30.3	40.0	9.7
76.8	19.2	8.4	1.6	156	100	V	29.2	40.0	10.8
115.2	26.3	9.6	1.9	163	100	V	37.8	43.5	5.7
131.0	22.6	10.5	2.1	150	100	V	35.2	43.5	8.3
142.4	19.8	11.6	2.2	223	100	V	33.6	43.5	9.9
155.6	24.7	12.2	2.3	175	100	V	39.2	43.5	4.3
167.2	19.3	12.3	2.3	12	102	V	33.9	43.5	9.6
185.2	27.9	9.8	2.4	300	100	V	40.1	43.5	3.4
194.2	26.3	8.9	2.5	205	110	V	37.7	43.5	5.8
213.6	25.8	8.3	2.5	330	296	H	36.6	43.5	6.9
220.2	27.6	8.5	2.8	264	108	V	38.9	46.0	7.1
239.2	18.9	10.1	2.8	29	302	H	31.8	46.0	14.2
255.4	17.4	11.0	2.8	332	300	H	31.2	46.0	14.8
302.4	16.8	11.7	3.3	289	106	V	31.8	46.0	14.2
360.1	16.5	11.7	3.6	15	295	H	31.8	46.0	14.2
439.4	17.2	13.8	4.4	152	298	H	35.4	46.0	10.6
464.1	19.8	14.2	4.6	158	110	V	38.6	46.0	7.4
519.5	15.2	15.3	4.7	220	112	V	35.2	46.0	10.8

Coverage factor of k=2 will ensure that the level of confidence will be approximately 95.45%,
Uncertainty U = -5.21 / +4.55 [dB]

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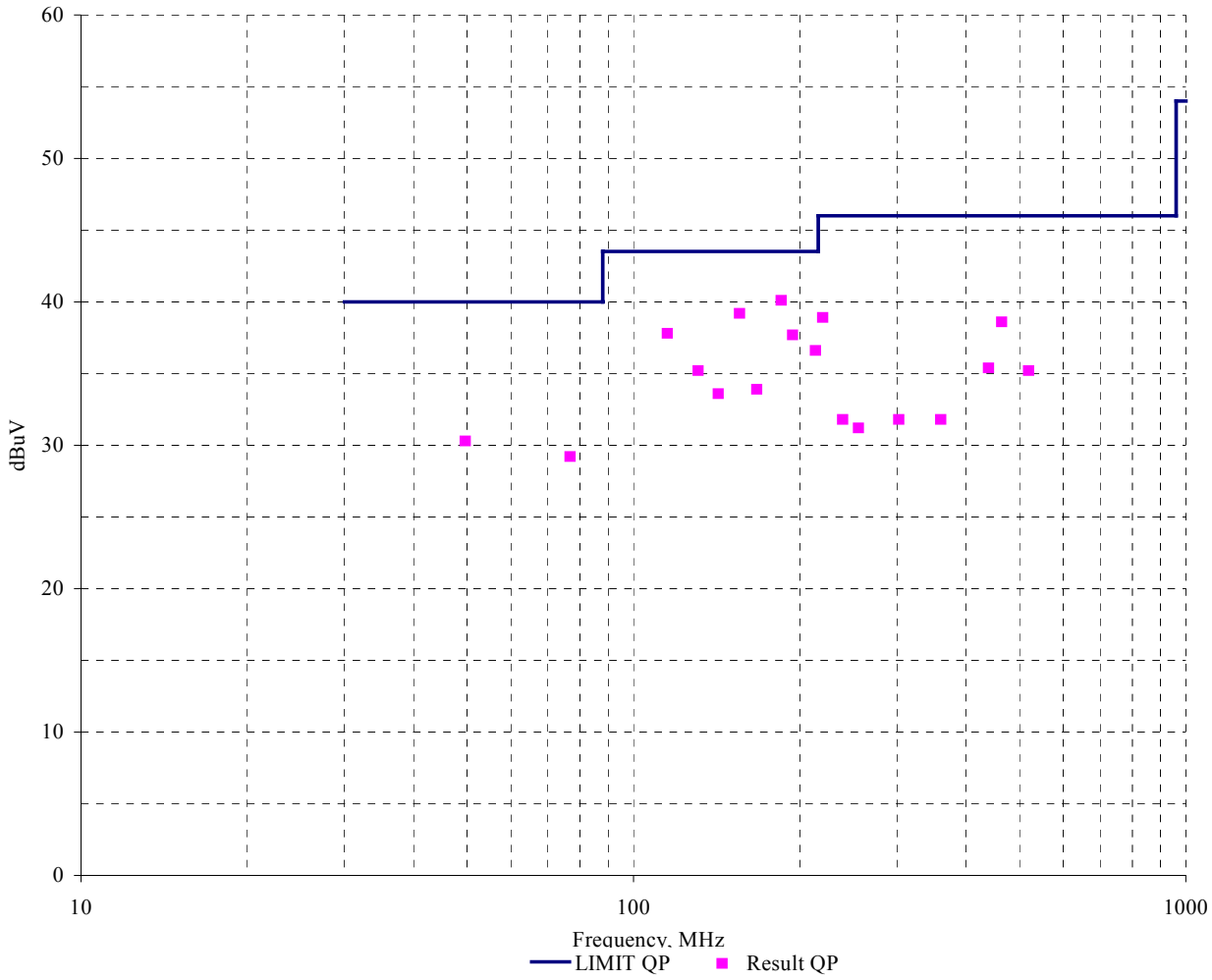
MEASUREMENT OF DISTURBANCE RADIATION



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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 : Nov. 21, 2003

End of testing : Nov. 26, 2003

Reviewed by :	Approved by :
Joon H. Lee. EMC Manager IST EMC Lab.	G. Chung Chief of EMC Lab.

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