



EMISSION TEST REPORT

Test report file No. : **01-IST-012/FB** Date of issue : Feb. 05, 2001.

Model / Type No. : 2015XLS

Kind of product : TFT-LCD Monitor.

Applicant : TOVIS Co., Ltd

Manufacturer : TOVIS Co., Ltd

Address : 53B-2L/444-2, NamDong Industrial Area, NonHyun-Dong,
NamDong-Gu, Incheon-City, Korea.

Test result according to the regulation(s)

☒ Positive ☐ Negative

at page 3.

This test report without appendix consists of 15 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.

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Conducted emissions (Mains)	: 450 kHz - 30 MHz	<u>11 ~ 13</u>
Radiated emissions	: 30 MHz – 1 GHz	<u>14</u>

C) Appendix

TEST REGULATIONS

The tests were performed according to the following regulations ;

EN 50081-1	/	2. 1991.		
EN 55011	/	3. 1991.	Croup 1.	Croup 2.
			Class A.	Class B.
EN 55014	/	4. 1993.	Household appliances and similar	
			Portable tools	
			Semiconductor devices	
- EN 55014 / A2:1990				
- EN 55015 / A1:1990		- EN 55015 / 2.1987	- EN 55015 / 12.1993	
- EN 55022 / 8.1994		- Class A	- Class B	

■ - FCC Part 15, Subpart B (Unintentional Devices, Class B)

- BS
- VCCI
- CISPR

All testing were conducted at IST EMC Laboratory.

ENVIRONMENTAL CONDITIONS

Temperature	<u>18</u>
Humidity	<u>45</u> %
Atmospheric pressure	<u>999</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 :

Type	Manufacturer	Calibration. Date	Serial Number
■ ESH 3	Rohde & Schwarz	Oct. 08, 2000	861742/018
■- 3725/2	EMCO	Oct. 08, 2000	9102-1788
■- 3825/2	EMCO	Dec. 20, 2000	9103-1788

Test - accessories :

Type	Manufacturer
■ Aneroid Barometer	Sato
■ Hygrometer	Sato

Measurement Procedures :

Conducted emissions measurements were made in accordance with ANSI C-63.4-1992, "FCC procedure for measuring RF Emissions from Computing Devices".

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 :



B. K. Bae. / 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 :

- | | |
|-----------------|-------------------|
| ■ - Open-site 1 | - Compact chamber |
| ■ - 3 meters. | - 10 meters |

Used testing instruments :

Type	Manufacturer	Calibration. Date	Serial Number
■ ESVP	Rohde & Schwarz	July. 21, 2000	861744/004
■ VULB 9160	Schwarzbeck	July. 11, 2000	3048

Test - accessories :

Type	Manufacturer
■ Aneroid Barometer	Sato
■ Hygrometer	Sato

Measurement procedures

Radiated measurements were in accordance with ANSI C63.4-1992 "FCC Procedure for measuring RF Emissions from Computing Devices." 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 :



B. K. Bae. / Research Engineer
IST EMC Lab.

EQUIPMENT UNDER TEST

Equipment Description

The Equipment Under Test (EUT) is the **15.1-inch TFT LCD Monitor of Tovis Co., Ltd.**

- Maximum Resolution: 1024 x 768, H-Sync: 60kHz / V-Sync: 75Hz
- Frequency Range: H-Sync: 30kHz - 61kHz , V-Sync: 55Hz - 80Hz
- Display Area: 12.09”(W) x 9.07”(H)
- Weight: 17 lbs;4.8kg
- Power Supply Input: 100-220 Vac, 50/60Hz, 12 Vdc, 3.5A
- Power Consumption: 23W(Max.)
- Power Cord: Unshielded

Operation - mode of the E.U.T. :

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

- Test program (H – Pattern) : Scrolling “H” characters under MS Windows98
- Test program (customer specific)

Configuration of the equipment under test :

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

Equipment	Type	Brand	Serial No	FCC ID
PC	Brio BA600/550	HP	SG01301176	N/A
Keyboard	SK-2502C	HP	M000375059	N/A
Printer	A0302384	Northern Telecom	26633S60168	BS16XU2225C-L
Mouse1	M-S48A	HP	LZA00850320	JNZ201213
Mouse2	M-M28	Logitech	LCA53305547	DZL210365

Cable Type :

- Unshielded AC power cable : 1.8m
- Shielded monitor’s signal cable : 1.5m

TEST RESULT

Conducted emissions : 450 kHz - 30 MHz

The requirements are.

■ KEPT

NOT KEPT

Min. limit margin

-5.9 dB at 13.78 MHz

Remarks : See test-graph to be attached at pages 11~13.

Radiated emissions (magnetic field) : 10 kHz - 30 MHz

The requirements are

KEPT

NOT KEPT

Max. limit margin.

_____ dB at _____ MHz

Remarks :

Radiated emissions (electric field) 30 MHz - 2000 MHz

The requirements are

■ KEPT

NOT KEPT

Min. limit margin

-4.3 dB at 286.0 MHz

Remarks : See test-data at page 14.

**Test Sep-Up
(Type : 2015XLS)**



Figure 1(a) : Conducted emission 450kHz ~ 30MHz

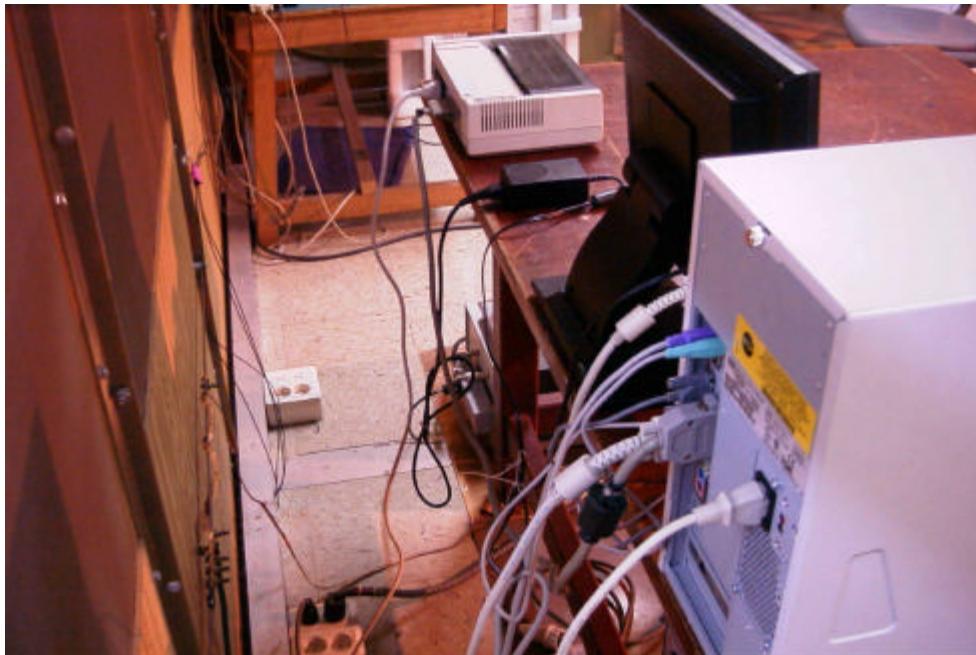


Figure 1(b) : Conducted emission 450kHz ~ 30MHz

**Test Sep-Up
(Type : 2015XLS)**



Figure 2(a) : Radiated Emission 30MHz ~ 1000MHz

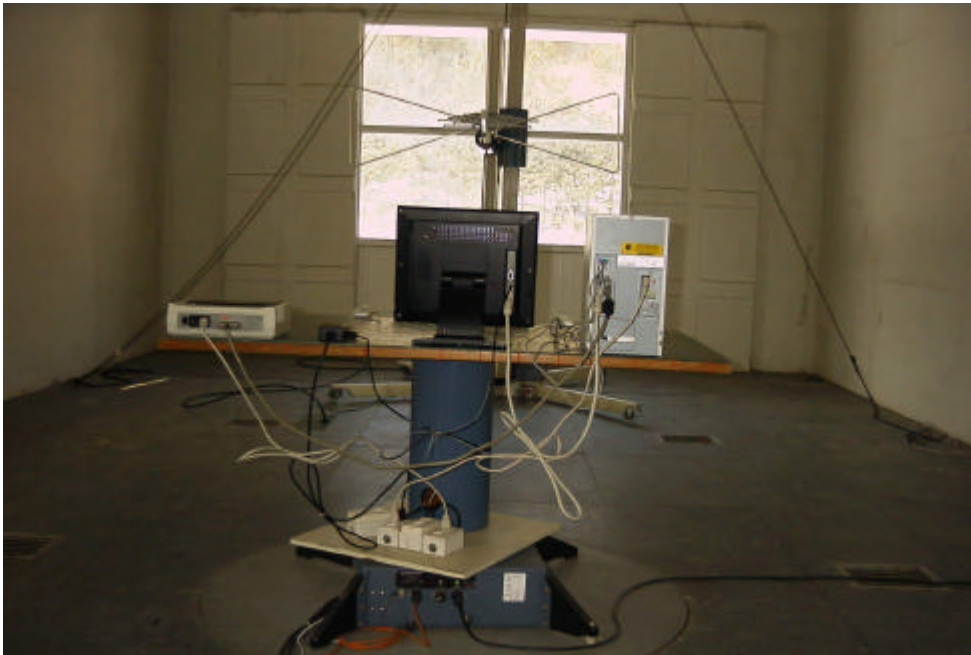
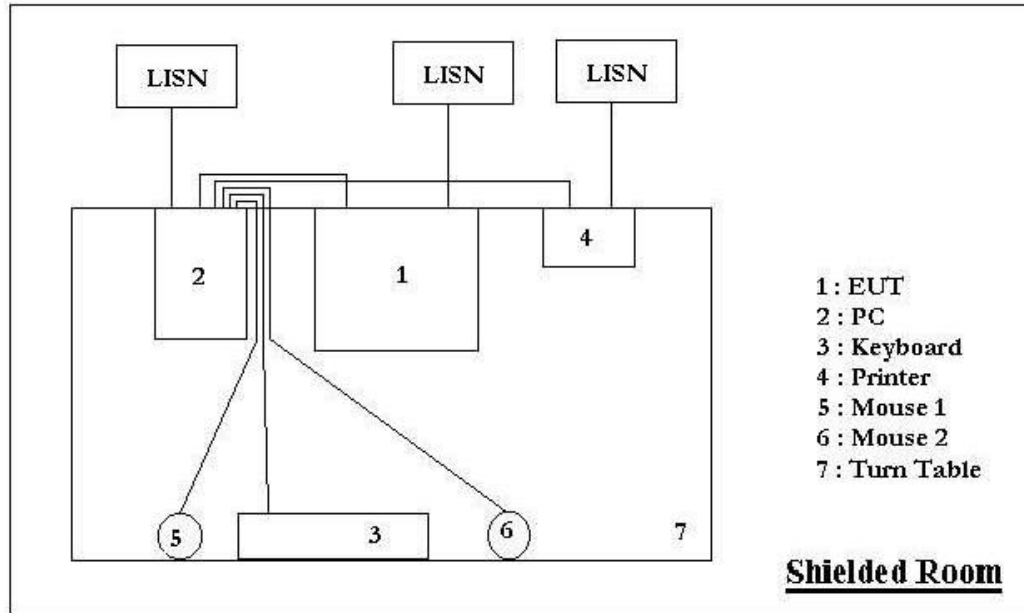
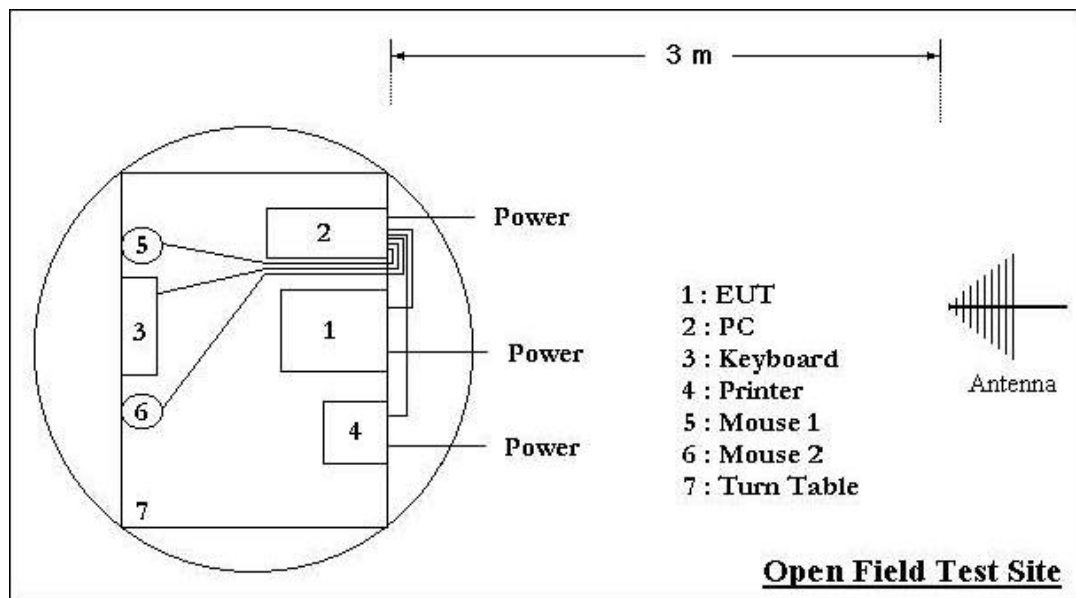


Figure 2(b) : Radiated Emission 30MHz ~ 1000MHz

Test Set-Up (Type : 2015XLS)



Picture 1 : Conducted emission 450kHz ~ 30MHz



Picture 2 : Radiated emission 30MHz ~ 1000MHz

Conducted Emission Test Data

Type : 2015XLS
 Manufacturer : TOVIS Co., Ltd
 Operation mode : Scrolling "H" pattern display 1024 X 768, 60Hz
 Date : Jan. 19, 2001

Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (*L1/**N)	Limit [dBμV]	Margin [dB]
0.58	33.9	0.8	L1	48.0	- 13.3
0.76	33.3	0.8	L1	48.0	- 13.9
13.78	41.3	0.8	L1	48.0	- 5.9
0.47	31.4	0.8	N	48.0	- 15.8
13.89	41.1	0.8	N	48.0	- 6.1
19.59	34.0	0.8	N	48.0	- 13.2

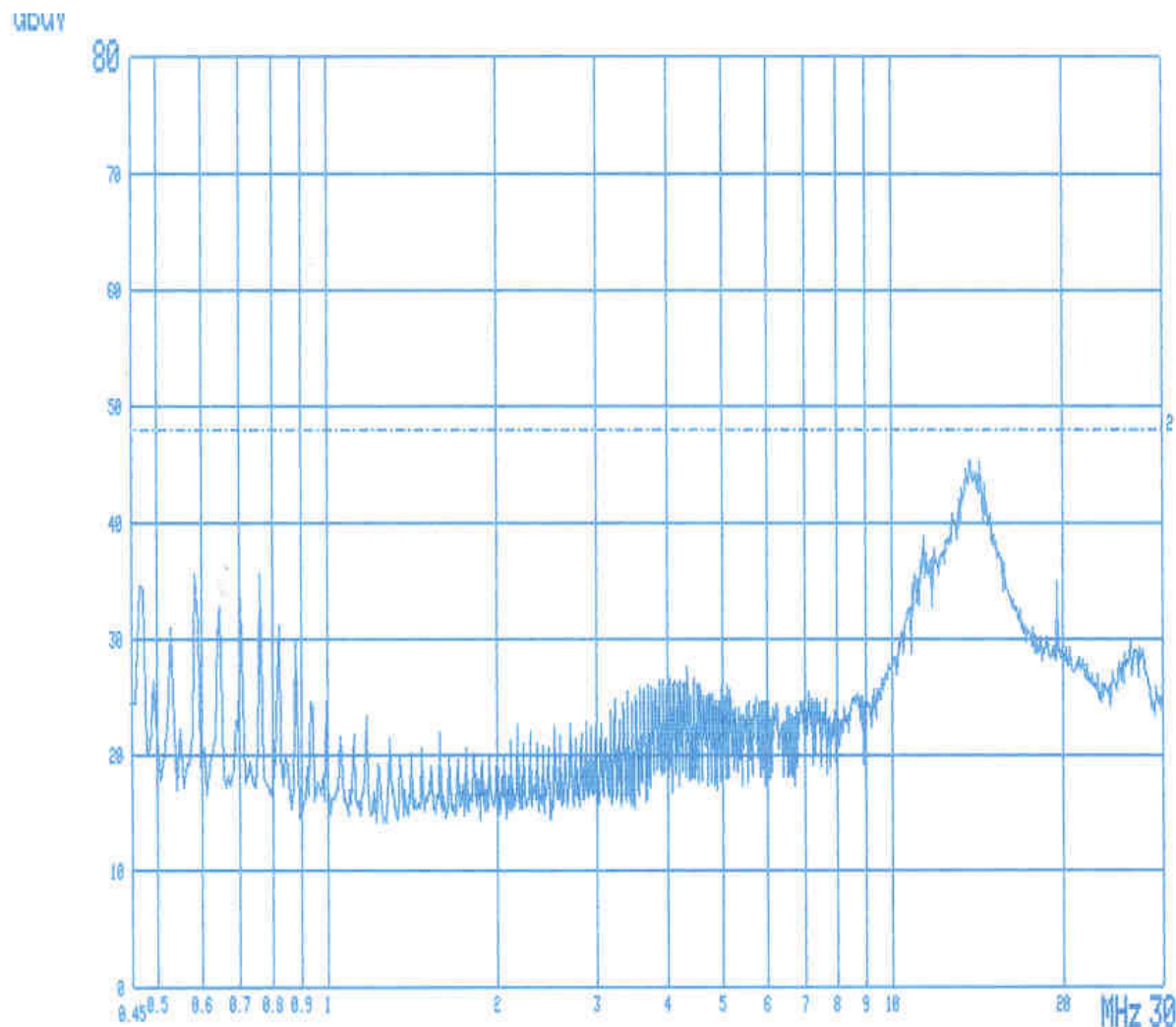
*L1 : Live Line

**N : Neutral Line

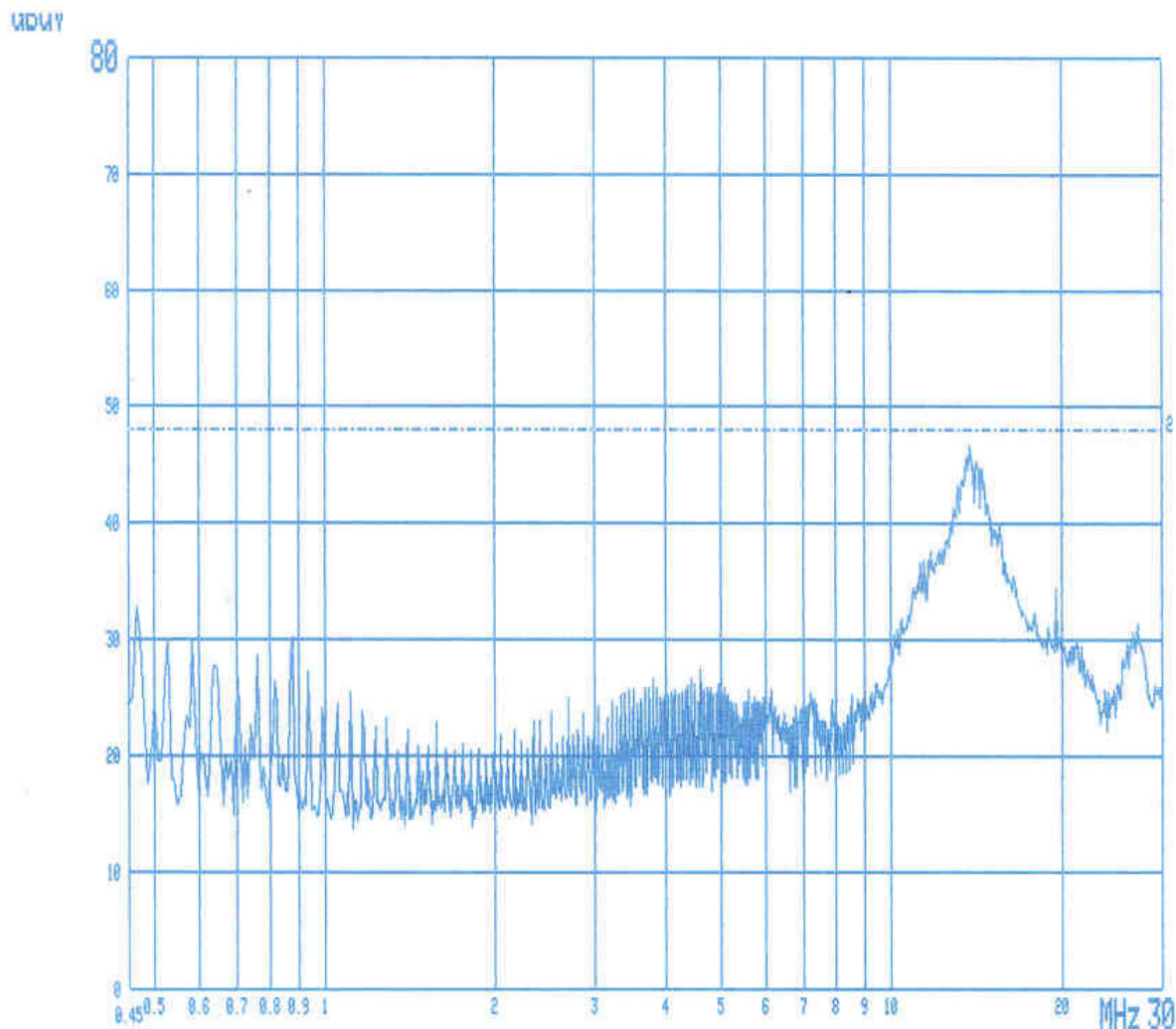
*** " — " is means that the EuT has a margin

**** Please refer to data graphs at page 12 ~ 13

***** Cable loss are less than 0.1 dB



MODEL: 2015XLS
120Vac 60Hz Phase: L1



MODEL: 2015XLS
120Vac 60Hz Phase: N

Radiation Test Data

Type : 2015XLS
 Manufacturer : Tovis Co., Ltd
 Operation mode : Scrolling "H" pattern display 1024 X 768, 60Hz
 Test distance : 3 m
 Antenna : VULB9160
 Date : Jan. 29, 2001.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [m]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
39.2	20.7	13.6	1.2	28	100	V	35.4	40.0	-4.6
45.8	24.2	9.9	1.2	30	100	V	35.3	40.0	-4.6
52.4	23.1	10.7	1.3	26	100	V	35.1	40.0	-4.9
65.4	18.4	10.5	1.5	14	102	V	30.4	40.0	-9.6
78.4	22.4	8.2	1.6	29	104	V	32.2	40.0	-7.8
85.0	23.7	7.3	1.7	20	100	V	32.6	40.0	-7.4
131.0	20.1	10.5	2.1	25	100	V	32.7	43.5	-10.8
137.4	18.9	11.1	2.1	278	105	V	32.2	43.5	-11.3
144.0	24.0	11.8	2.2	270	105	V	38.0	43.5	-5.5
150.6	22.7	12.2	2.3	274	100	V	37.2	43.5	-6.4
163.6	19.9	12.3	2.3	264	102	V	34.6	43.5	-8.9
176.8	18.6	11.2	2.4	273	114	V	32.2	43.5	-11.3
196.2	26.3	8.8	2.5	274	109	V	37.6	43.5	-5.9
209.4	22.4	8.4	2.5	30	100	V	33.3	43.5	-10.2
215.8	21.4	8.4	2.7	27	106	V	32.5	43.5	-11.0
228.8	20.5	9.3	2.8	26	394	H	32.6	46.0	-13.4
247.8	25.0	10.7	2.8	46	376	H	38.5	46.0	-7.5
267.4	24.7	11.5	3.0	29	370	H	39.1	46.0	-6.9
286.0	26.8	11.8	3.1	36	371	H	41.7	46.0	-4.3
302.6	22.6	11.7	3.3	37	150	V	37.6	46.0	-8.4
325.5	25.9	11.7	3.4	40	155	V	41.0	46.0	-5.0
382.1	23.1	12.5	3.8	280	260	H	39.4	46.0	-6.6
467.4	18.4	14.3	4.7	274	140	V	37.3	46.0	-8.7

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 : Jan. 15, 2000

End of testing : Jan. 30, 2000

Reviewed by :

Approved by :

Joan H Lee

Qin Meng

Joon H. Lee. EMC Manager
IST EMC Lab.

G. Chung Chief of EMC Lab.