



## EMISSION TEST REPORT

Test report file No. : **01-IST-016/FB** Date of issue : May 18, 2001.

Model / Type No. : IV001AS

Kind of product : VGA Card

Applicant : Inside Telnetcom Co., Ltd.

Manufacturer : Inside Telnetcom Co., Ltd.

Address : Rm.608 Kum-Gang Venturetel Bldg, #1108, Bi-San Dong,  
Dong-An Gu, An-Yang City, Kyung-Gi Do, KOREA

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

☒ Positive ☐ Negative

at page 3.

This test report without appendix consists of 13 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>   |
| Test Result              | <u>7</u>   |
| Test-setup (Figures)     | <u>8</u>   |
| Summary                  | <u>13</u>  |

### B) Test Data.

|                             |                    |               |
|-----------------------------|--------------------|---------------|
| Conducted emissions (Mains) | : 450 kHz - 30 MHz | <u>9 ~ 11</u> |
| Radiated emissions          | : 30 MHz – 1 GHz   | <u>12</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>24</u>        |
| Humidity             | <u>45</u> %      |
| Atmospheric pressure | <u>1000</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 :

| <u>Name</u> | <u>Type</u>   | <u>Manufacturer</u> | <u>Calibration. Date</u> | <u>Serial Number</u> |
|-------------|---------------|---------------------|--------------------------|----------------------|
| ■ ESH 3     | Test Receiver | Rohde & Schwarz     | Oct. 08, 2000            | 861742/018           |
| ■ 3725/2    | LISN          | EMCO                | Oct. 08, 2000            | 9102-1788            |
| ■ 3825/2    | LISN          | EMCO                | Dec. 20, 2000            | 9103-1788            |
| ■ ESH 3-Z2  | Pulse Limiter | Rohde & Schwarz     | Jun. 16, 2001            | 357.8810.52          |

### Test - accessories :

| <u>Type</u>         | <u>Manufacturer</u> |
|---------------------|---------------------|
| ■ 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 :



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 :**

| <u>Name</u> | <u>Type</u>   | <u>Manufacturer</u> | <u>Calibration. Date</u> | <u>Serial Number</u> |
|-------------|---------------|---------------------|--------------------------|----------------------|
| ■ ESVP      | Test Receiver | Rohde & Schwarz     | July. 21, 2000           | 861744/004           |
| ■ VULB 9160 | Antenna       | 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 “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 :**

B.H.R.

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

## EQUIPMENT UNDER TEST

### Equipment Description

The Equipment Under Test (EUT) is the **VGA Card of Inside Telnetcom Co., Ltd.**

|                      |                                       |
|----------------------|---------------------------------------|
| Product Type         | - Type: VGA Card (3D/2D)              |
|                      | - GPU : RIVA TNT2 m64                 |
|                      | - SDRAM : 32MB                        |
|                      | - Flash ROM Bios                      |
| Video                | - 128Bit Twin Texel                   |
|                      | - 32Bit VGA/SVGA                      |
|                      | - AGP 4X/2X Interface(AGP 2.0, 1.0)   |
|                      | - Full Screen, Full Frame DVD Replay  |
| Resolution &         | - 1600*1200                           |
| Scan Frequency       | - Vertical: 85Hz(True Color)          |
| Power rating         | - DC 5V, 3.3V,12V,1.6V                |
| Dimension            | - 149.6(W) x 82.58(H) x 1.6(D) : (mm) |
| Internal frequencies | - Oscillator clock-14.31818MHz        |

### 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        | HP Pavilion 8821 | HP               | KR1105100                   | DoC           |
| Keyboard  | 5181             | HP               | BM10206995                  | DoC           |
| Printer   | A0302384         | Northern Telecom | 26633S60168                 | BS16XU2225C-L |
| Mouse1    | M-S48a           | HP               | LZA10251257                 | JNZ201213     |
| Mouse2    | M-M28            | Logitech         | LCA53305547                 | DZL210365     |
| Joystick  | X03-5740         | Microsoft        | 85791-579-<br>8892384-00000 | -             |
| Head-Set  | NM-V33           | TOCO             | N/A                         | -             |

- ☒ Unshielded AC power cable : 1.8m
- ☒ Shielded monitor's signal cables(Analog) : 1.5m
- ☒ Unshielded USB cables : 1.6m

## TEST RESULT

### Conducted emissions : 450 kHz - 30 MHz

The requirements are.

■ KEPT

NOT KEPT

Min. limit margin

\_\_\_\_\_ 9.0 \_\_\_\_\_ dB at \_\_\_\_\_ 11.918 \_\_\_\_\_ MHz

Remarks : See test-graph to be attached at pages 9~11.

### 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 - 1000 MHz

The requirements are

■ KEPT

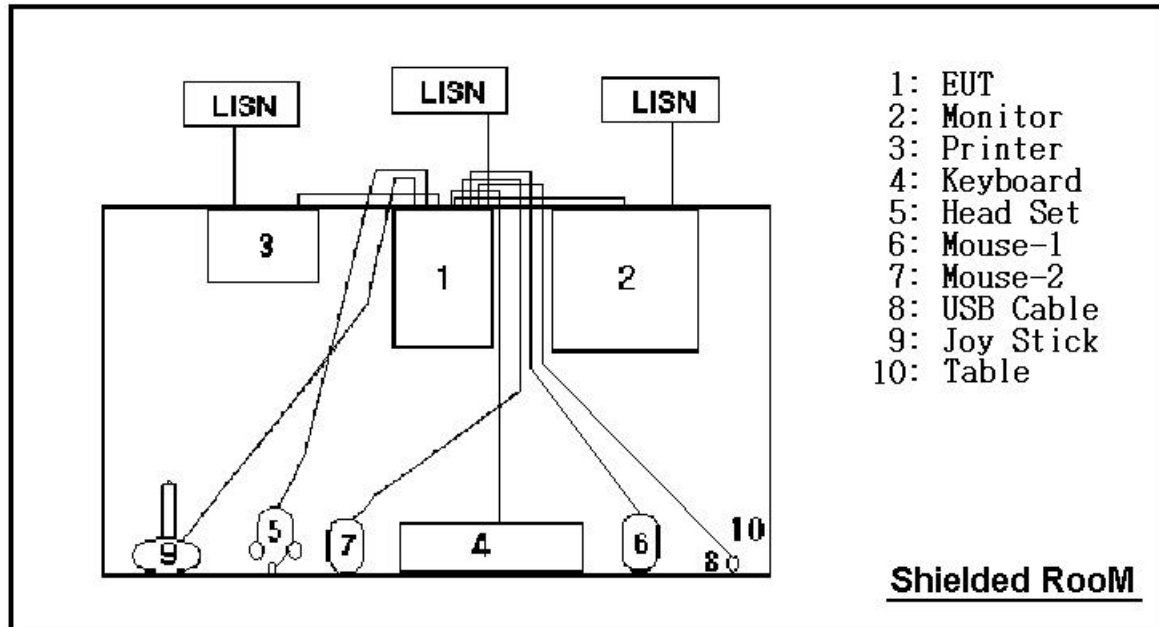
NOT KEPT

Min. limit margin

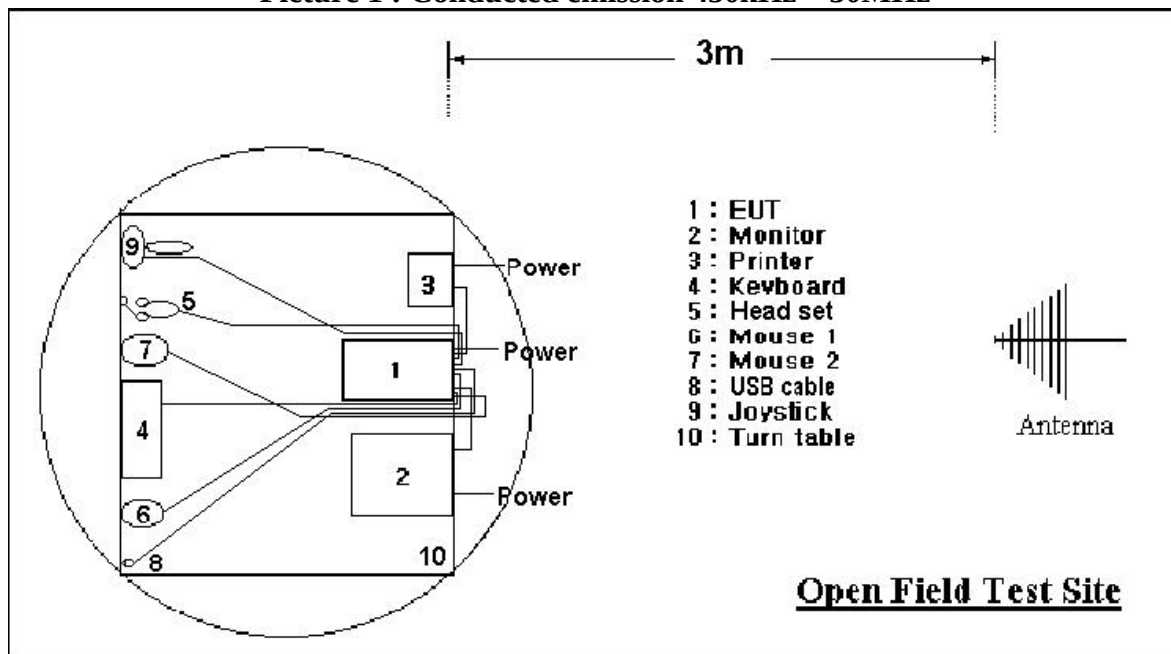
\_\_\_\_\_ 8.2 \_\_\_\_\_ dB at \_\_\_\_\_ 399.4 \_\_\_\_\_ MHz

Remarks : See test-data at page 12.

**Test Set-Up  
(Type : IV001AS)**



**Picture 1 : Conducted emission 450kHz ~ 30MHz**



**Picture 2 : Radiated emission 30MHz ~ 1000MHz**

## Conducted Emission Test Data

Type : IV001AS  
 Manufacturer : Inside Telnetcom Co., Ltd.  
 Operation mode : Scrolling "H" pattern display 1600 X 1200, 85Hz  
 Date : May. 15, 2001

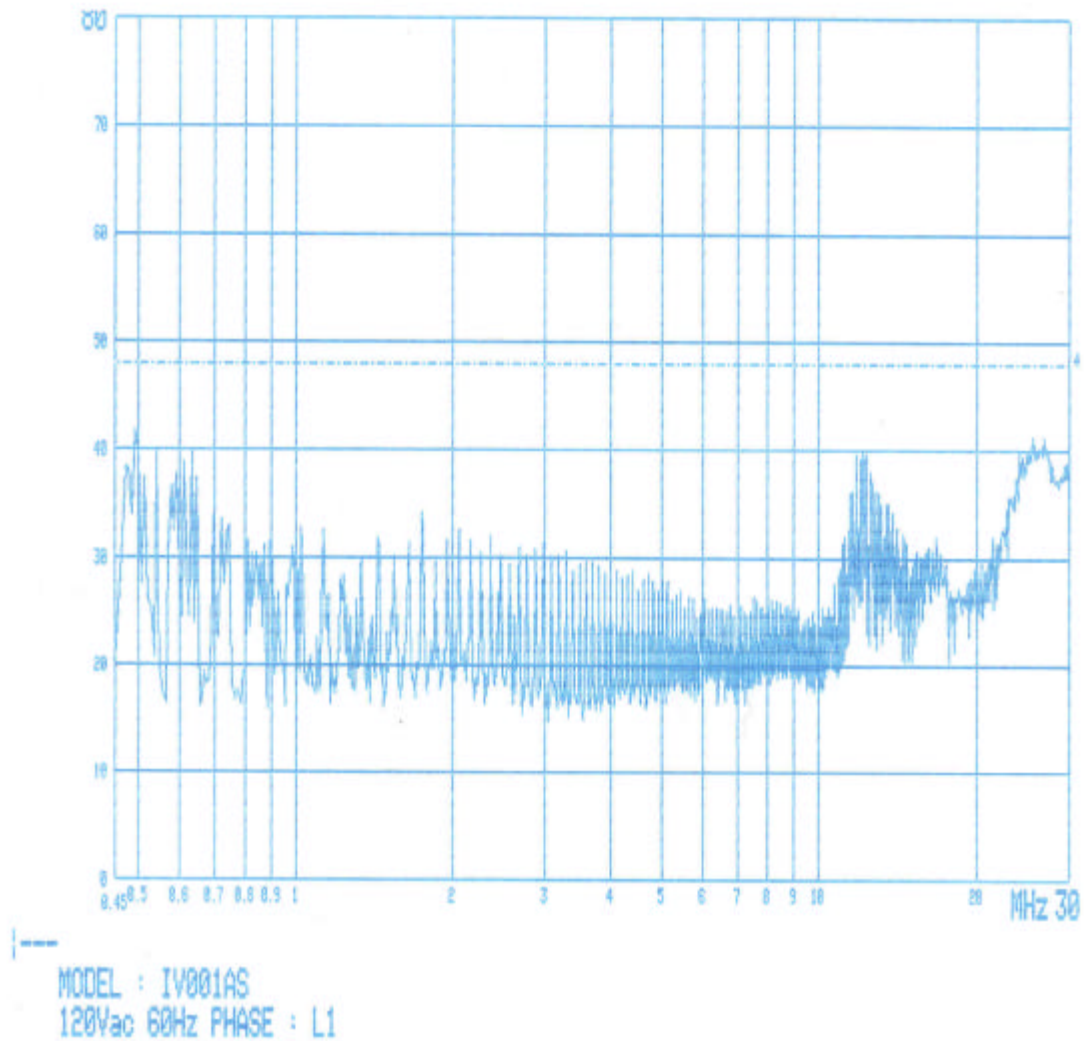
### Highest Emissions relative to the limit

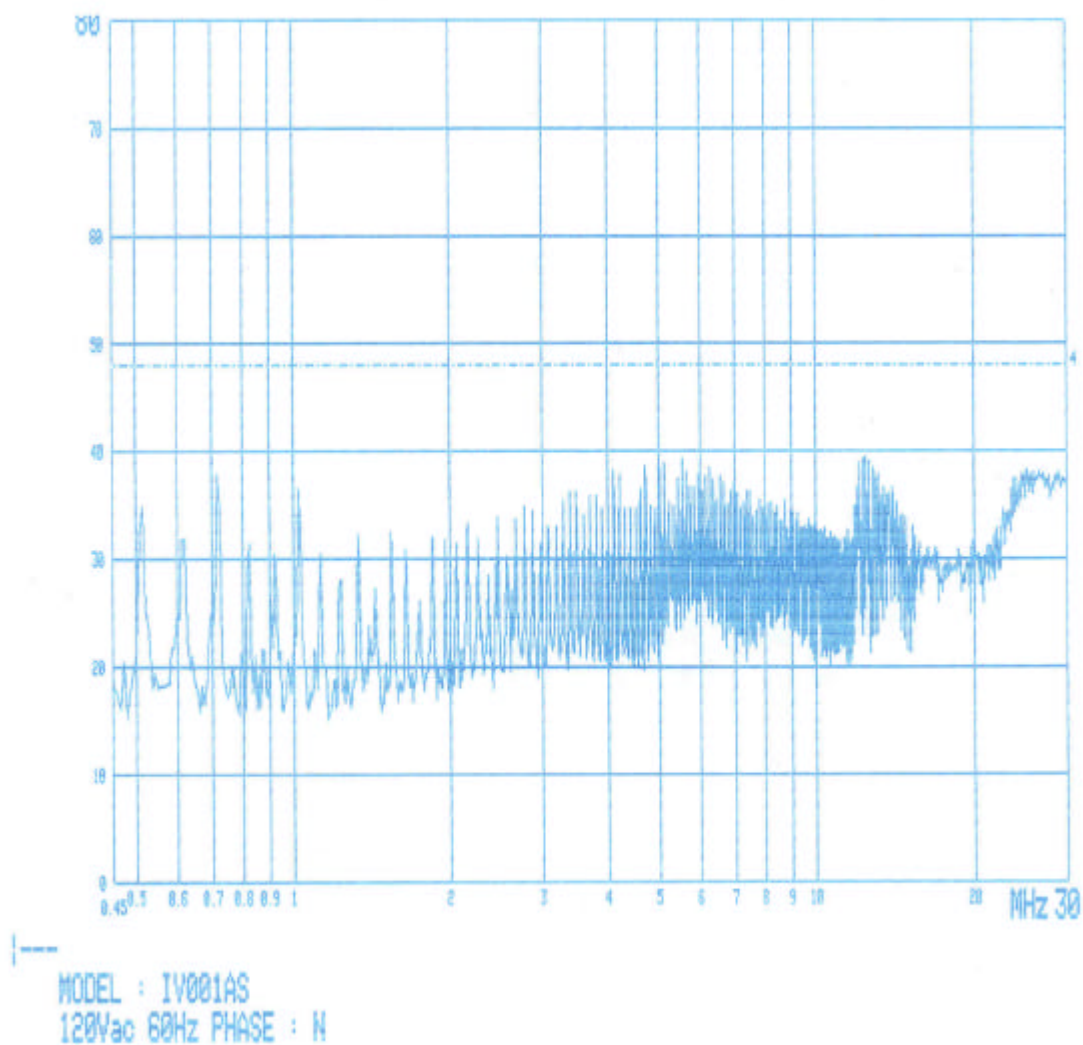
| Frequency<br>[MHz]              | Reading<br>[dBμV] | Insertion<br>loss<br>[dB] | Phase<br>(L1/N) | Result<br>[dBμV] | Limit<br>[dBμV] | Margin<br>[dB] |
|---------------------------------|-------------------|---------------------------|-----------------|------------------|-----------------|----------------|
| 0.514                           | 31.3              | 0.8                       | L1              | 32.1             | 48.0            | 15.9           |
| 0.719                           | 36.4              | 0.8                       |                 | 37.2             | 48.0            | 10.8           |
| 1.746                           | 32.4              | 0.8                       |                 | 33.2             | 48.0            | 14.8           |
| 11.816                          | 37.4              | 0.8                       |                 | 38.2             | 48.0            | 9.8            |
| 11.918                          | 38.2              | 0.8                       |                 | 39.0             | 48.0            | 9.0            |
| 25.680                          | 37.2              | 0.8                       |                 | 38.0             | 48.0            | 10.0           |
| 0.719                           | 36.3              | 0.8                       | N               | 37.1             | 48.0            | 10.9           |
| 1.027                           | 35.3              | 0.8                       |                 | 36.1             | 48.0            | 11.9           |
| 5.133                           | 36.6              | 0.8                       |                 | 37.4             | 48.0            | 10.6           |
| 5.545                           | 36.7              | 0.8                       |                 | 37.5             | 48.0            | 10.5           |
| 12.425                          | 37.5              | 0.8                       |                 | 38.3             | 48.0            | 9.7            |
| 25.152                          | 34.7              | 0.8                       |                 | 35.5             | 48.0            | 12.5           |
| Cable loss are less than 0.1 dB |                   |                           |                 |                  |                 |                |

\*L1 : Live Line

\*\*N : Neutral Line

\*\*\* Please refer to data graphs at page 10 ~ 11





## Radiation Test Data

Type : IV001AS  
 Manufacturer : Inside Telnetcom Co., Ltd.  
 Operation mode : Scrolling "H" pattern display 1600 X 1200, 85Hz  
 Test distance : 3 m  
 Antenna : VULB9160  
 Date : May. 16, 2001.

| 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] |
|----------------|-------------------|---------------------------|-----------------------|----------------|----------------|----------------|------------------|-----------------|----------------|
| 66.8           | 8.6               | 10.3                      | 1.5                   | 162            | 110            | V              | 20.4             | 40.0            | 19.6           |
| 133.4          | 8.5               | 10.7                      | 2.1                   | 123            | 108            | V              | 21.3             | 43.5            | 22.2           |
| 142.3          | 15.0              | 11.7                      | 2.2                   | 101            | 125            | V              | 28.9             | 43.5            | 14.6           |
| 144.0          | 8.0               | 11.8                      | 2.2                   | 175            | 142            | V              | 22.0             | 43.5            | 21.5           |
| 167.0          | 7.5               | 12.3                      | 2.4                   | 183            | 185            | V              | 22.2             | 43.5            | 21.3           |
| 200.5          | 7.2               | 8.5                       | 2.5                   | 184            | 187            | V              | 18.2             | 43.5            | 25.3           |
| 233.5          | 6.0               | 9.8                       | 2.8                   | 177            | 284            | V              | 18.6             | 46.0            | 27.4           |
| 275.3          | 8.7               | 11.7                      | 3.1                   | 11             | 372            | H              | 23.5             | 46.0            | 22.5           |
| 300.0          | 10.0              | 11.7                      | 3.3                   | 17             | 125            | V              | 25.0             | 46.0            | 21.0           |
| 378.4          | 6.0               | 12.5                      | 3.8                   | 176            | 133            | V              | 22.3             | 46.0            | 23.7           |
| 386.6          | 9.0               | 12.5                      | 3.8                   | 154            | 224            | H              | 25.3             | 46.0            | 20.7           |
| 399.4          | 20.5              | 13.1                      | 4.2                   | 162            | 121            | V              | 37.8             | 46.0            | 8.2            |
| 406.7          | 8.5               | 13.3                      | 4.3                   | 124            | 118            | V              | 26.1             | 46.0            | 19.9           |

## 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 : May. 15, 2001

End of testing : May. 16, 2001

**Reviewed by :**



**Joon H. Lee. EMC Manager**  
**IST EMC Lab.**

**Approved by :**



**G. Chung Chief of EMC Lab.**