

Reference No.:A03102903 Report No.:FCBA03102903 FCC ID:KAO-GS10-GS20

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Date:Dec. 02, 2003

Product Name: Server

Model No.: B2904T15 Transport GS10, GS10, GS20

Applicant: TYAN COMPUTER CORP.

7TH FL., NO. 187, TIDING BLVD., SEC. 2, TAIPEI,

TAIWAN, R.O.C.

Date of Receipt: Oct. 29, 2003 Finished date of Test: Nov. 26, 2003

Applicable Standards: 47 CFR Part 15, Subpart B, Class B

ANSI C63.4:1992

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By: Sunyou Chen Date: 12/2/2003

Approved By: Jahnson Ho, Director)

Lab Code: 200099-0



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1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP, TÜV, NEMKO and SRT.
- The NVLAP logo applies only to the applicable standards specified in this report.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 120 Vac/60 Hz, was used during the test.



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2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

| PRODUCT | Server | | | |
|---|--|--|--|--|
| MODEL NO. B2904T15 Transport GS10, GS10, GS20 | | | | |
| POWER SUPPLY | Input:100~240V, 60-50Hz, 6-3A DC output :250W | | | |
| CABLE | N/A | | | |

NOTE:

The EUT has three model numbers as above on market. They are identical in all aspects except for the following:

| No. | Model No. | Internal Device | Use |
|-----|-------------------------|---|-------------------------------|
| 1 | B2904T15 Transport GS10 | S2094 Barebone(GS10)x1 | Model No. of TYAN |
| 2 | GS10 | Intel P4 1.8GHz 400MHzx1 256MB PC2100 DDR LPx2 ST 80GB 7200rpm HDx1 | Model No. for TYAN's customer |
| 3 | GS20 | S2094 Barebone(GS10)x1 Intel P4 2.4GHz 400MHzx1 256MB PC2100 DDR LPx2 MX 250GB U133 7200 RPM 8M HDx2 SMC9452TX EZ Card 1000 32 Bit Gigabit Ethernet Adapterx1 | Model No. for TYAN's customer |

For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

| DEVICE | BRAND / MAKER | MODEL # | FCC ID/DOC | REMARK |
|--------|------------------------------|------------------|------------|--------|
| POWER | SPARKLE POWER INT' L LTD. | FSP250-601U | DOC | |
| CPU | INTEL | P4 1.8GHz 400MHz | N/A | GS10 |
| CPU | INTEL | P4 2.4GHz 400MHz | N/A | GS20 |
| HDD | SEAGATE | ST380011A | N/A | GS10 |
| HDD | MAXTOR | 7Y250P00622R1 | N/A | GS20 |

- 1. The highest clock is 25MHz.
- 2. Frequency range to be measured.
 Radiated emission is 30MHz to 12GHz.



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2.3 DESCRIPTION OF TEST MODE

The EUT was pre-tested under the following resolution:

- (1) Radiated emission for frequency below 1000 MHz: 640x480, 1024x768, and 1280x960
- (2) Radiated emission for frequency above 1000 MHz: 1024x768, 1280x960 and 1600x1200

The worst emission was found under 1280x960 and therefore the test data of only this mode is recorded.

2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4:1992 and CISRP22:1997. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

| NO | DEVICE | BRAND | MODEL # | FCC ID / DOC | CABLE |
|----|----------|---------|---------|--------------|---|
| 1 | MONITOR | SAMSUNG | PG17IS | DOC | 1.5m unshielded power cord 1.2m shielded data cable |
| 2 | MODEM | ACEEX | DM-1414 | DOC | 1.5m unshielded DC power cord 1.2m shielded data cable |
| 3 | KEYBOARD | ACER | 6311-TA | DOC | 1.2m unshielded data cable |
| 4 | MOUSE | HP | M019UCA | DOC | 1.5m unshielded data cable |
| 5 | | | | | |
| 6 | | | | | |
| 7 | | | | | |

NOTE: For the actual test configuration, please refer to the photos of testing.

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of ITE and according to the specifications provided by the applicant, it must comply with the requirements of the following standards: 47 CFR Part 15 Subpart B, Class B

All tests have been performed and recorded as per the above standards.



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4. CONDUCTED EMISSION TEST

4.1 CONDUCTED EMISSION LIMIT

| FREQUENCY (MHz) | Class A | (dBmV) | Class B (dBmV) | | |
|------------------|------------|---------|----------------|---------|--|
| FREQUENCT (MITZ) | Quasi-peak | Average | Quasi-peak | Average | |
| 0.15 - 0.5 | 79 | 66 | 66 - 56 | 56 - 46 | |
| 0.5 - 5.0 | 73 | 60 | 56 | 46 | |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 | |

NOTE:

- 1. The lower limit shall apply at the transition frequencies.
- 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2 TEST EQUIPMENT

The following test equipment was used for the test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER | |
|--------------------------|----------------|--------------|--------------------|-----------------------------------|--|
| EMI TEST | 9 kHz TO | ROHDE & | ESHS30/ | AUG. 2004 | |
| RECEIVER | 30 MHz | SCHWARZ | 826003/008 | R&S | |
| LISN (for EUT) | 50 uH 50 ohm | SOLAR | 8012-50-R-24-BNC | JUN. 2004 | |
| LISIN (IOI EUT) | 50 μH, 50 ohm | ELECTRONICS | / 924839 | ETC | |
| LISN | FO∪LL FO obm | SOLAR | 9252-50-R-24-BNC | JUN. 2004 | |
| (for Peripheral) | 50μH, 50 ohm | ELECTRONICS | / 951318 | ETC | |
| 50 ohm | 50 ohm | HP | 11593A/ | JUN. 2004 | |
| TERMINATOR | 50 Onni | ПР | 2 | ETC | |
| COAXIAL | 2 | CLINCITY | J400/ | JUL. 2004 | |
| CABLE | 3m | SUNCITY | 3M | SRT | |
| ISOLATION | N/A | APC | AFC-11015/ | N/A | |
| TRANSFORMER | IN/A | APC | F102040016 | IN/A | |
| CII TED | OLINE 20A | FIL.COIL | FC-943/ | N/A | |
| FILTER | 2 LINE, 30A | FIL.COIL | 771 | IN/A | |
| CDOLIND DI ANE | 2.3M (H) x | CDT | NI/A | APR. 2004 | |
| GROUND PLANE | 2.4M (W) | SRT | N/A | SRT | |
| | 2.4M (H) x | CDT | NI/A | APR. 2004 | |
| GROUND PLANE | 2.4M (W) | SRT | N/A | SRT | |

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

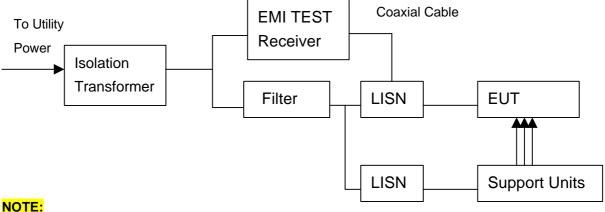


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4.3 TEST SETUP



NOTE

- 1. The EUT was put on a wooden table with 0.8m height above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
- 2. For the actual test configuration, please refer to the photos of testing.
- 3. The serial no. of the LISN connected to EUT is 951318.
- 4. The serial no. of the LISN connected to support units is 924839.

4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:1992 and CISRP22:1997. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50µH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, Find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

4.5 EUT OPERATING CONDITION

- 1. Under Liunx Red Hat 2.4.20-8 ran "H.sxw 5.0k" programs and PC sent "H" pattern or accessed the following peripherals directly or via EUT:
 - Color Monitor
 - RS232
 - Keyboard
 - Mouse
 - Printer
 - FDD
 - HDD



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4.6 TEST RESULT

Temperature: 26 °C Humidity: 63 %RH

Ferquency Range: 0.15 – 30 MHz Tested Mode: N/A

Receiver Detector: Q.P. and AV. Tested By: Lake Cheng

Tested Date: Nov.25, 2003

Power Line Measured: Line

| Freq. | Correct. Factor | | g Value mV) | Emissio (dB | n Level mV) | | mit mV) | | gin B) |
|--------|--------------------|------|----------------|----------------|----------------|------|------------|-------|-----------|
| () | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.275 | 0.20 | 34.5 | 32.3 | 34.7 | 32.5 | 60.9 | 50.9 | -26.2 | -18.4 |
| 0.472 | 0.20 | 32.8 | 28.5 | 33.0 | 28.7 | 56.5 | 46.5 | -23.5 | -17.8 |
| 1.377 | 0.20 | 31.0 | 28.1 | 31.2 | 28.3 | 56.0 | 46.0 | -24.8 | -17.7 |
| 4.779 | 0.31 | 32.4 | 25.1 | 32.7 | 25.4 | 56.0 | 46.0 | -23.3 | -20.6 |
| 11.396 | 0.43 | 49.5 | 45.2 | 49.9 | 45.6 | 60.0 | 50.0 | -10.1 | -4.4 |
| 19.857 | 0.60 | 44.2 | 37.2 | 44.8 | 37.8 | 60.0 | 50.0 | -15.2 | -12.2 |

Power Line Measured: Neutral

| Freq. | Correct. Factor | | g Value mV) | | n Level mV) | | mit mV) | Mar (d | gin B) |
|--------|--------------------|------|----------------|------|----------------|------|------------|-----------|-----------|
| () | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.205 | 0.20 | 41.6 | 33.2 | 41.8 | 33.4 | 63.4 | 53.4 | -21.6 | -20.0 |
| 0.478 | 0.20 | 37.2 | 33.3 | 37.4 | 33.5 | 56.4 | 46.4 | -19.0 | -12.9 |
| 1.025 | 0.20 | 32.8 | 29.3 | 33.0 | 29.5 | 56.0 | 46.0 | -23.0 | -16.5 |
| 4.916 | 0.31 | 28.7 | 22.8 | 29.0 | 23.1 | 56.0 | 46.0 | -27.0 | -22.9 |
| 11.666 | 0.43 | 47.9 | 43.2 | 48.3 | 43.6 | 60.0 | 50.0 | -11.7 | -6.4 |
| 19.920 | 0.60 | 38.6 | 29.0 | 39.2 | 29.6 | 60.0 | 50.0 | -20.8 | -20.4 |

- 1. Measurement uncertainty is +/-2dB
- 2. Emission level = Reading value + Correction factor
- 3. Correction Factor = Cable loss + Insertion loss of LISN
- 4. Margin value = Emission level Limit
- 5. The emission of other frequencies were very low against the limit.
- 6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



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5. RADIATED EMISSION TEST

5.1 RADIATED EMISSION LIMIT

CISPR 22:1997 limits of radiated emission measurement for frequency below 1000 MHz

| FREQUENCY (MHz) | Class A (at 10m) | Class B (at 10m) |
|------------------|------------------|------------------|
| FREQUENCT (WITZ) | dBmV/m | dBmV/m |
| 30 – 230 | 40 | 30 |
| 230 - 1000 | 47 | 37 |

NOTE:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level (dB μ V/m) = 20 log Emission level (μ V/m).

FCC Part 15, Subpart B limit of radiated emission for frequency above 1000 MHz

| FREQUENCY (MHz) | Class A (dB _l | uV/m) (at 3m) | Class B (dBµV/m) (at 3m) | | |
|------------------|--------------------------|---------------|--------------------------|------|--|
| PREQUENCT (WIHZ) | PK. | AV. | PK. | AV. | |
| Above 1000 | 80.0 | 60.0 | 74.0 | 54.0 | |

5.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test:

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|--------------------------|----------------|--------------|--------------------|--------------------------------|
| EMI TEST | 20 MHz TO | ROHDE & | ESVS30/ | AUG. 2004 |
| RECEIVER | 1000 MHz | SCHWARZ | 841997/003 | ETC |
| BI-LOG | 25 MHz TO | EMCO | 3142/ | APR. 2004 |
| ANTENNA | 2 GHz | EIVICO | 9701-1124 | SRT |
| OATS | 3 – 10 M | SRT | SRT-1 | APR. 2004 |
| UAIS | MEASUREMENT | SKI | SK1-1 | SRT |
| COAXIAL | OCM | CLINICITY | J400/ | AUG. 2004 |
| CABLE | 25M | M SUNCITY | | SRT |
| EII TED | OLINE 20A | FIL COII | FC-943/ | NI/A |
| FILTER | 2 LINE, 30A | FIL.COIL | 869 | N/A |
| FREQUENCY | NI/A | ADC | AFC-1KW/ | AUG. 2004 |
| CONVERTER | N/A | APC | 860612 | SRT |

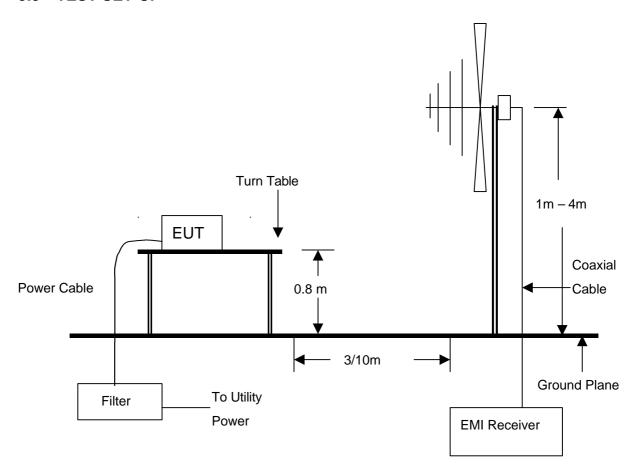
- 1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
- 2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
- 3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.



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5.3 TEST SET-UP



- 1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
- 2. For the actual test configuration, please refer to the photos of testing.



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5.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:1992 and CISPR 22:1997. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, Find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

5.5 EUT OPERATING CONDITION

Same as section 4.5 of this report.



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5.6 RADIATED EMISSION TEST RESULT

26 °C 63 %RH Temperature: Humidity: Ferquency Range: 30 - 1000 MHzMeasured Distance: 10m Receiver Detector: Q.P. Tested Mode: N/A Nov. 25, 2003 Tested By: Lake Cheng Tested Date:

Antenna Polarization: Horizontal

| ATRICITITA I GIATIZATIONI, IONIZOTRAI | | | | | | | | | |
|---------------------------------------|-------|-------------|---------|----------|----------|--------|-------|-------|--|
| Frequency | Cable | Antenna | Reading | Emission | Limit | Margin | | | |
| - | Loss | Factor Data | | Level | | | AZ(°) | EL(m) | |
| (MHz) | (dB) | (dB/m) | (dBµV) | (dBµV/m) | (dBµV/m) | (dB) | | | |
| 164.3500 | 1.58 | 8.94 | 13.5 | 24.0 | 30.0 | -6.0 | 110 | 4.00 | |
| 536.0000 | 3.12 | 19.32 | 10.0 | 32.4 | 37.0 | -4.6 | 215 | 4.00 | |
| 598.2300 | 2.71 | 20.75 | 8.4 | 31.9 | 37.0 | -5.1 | 116 | 3.25 | |
| 622.5600 | 3.52 | 20.93 | 8.9 | 33.4 | 37.0 | -3.7 | 87.6 | 3.14 | |
| 873.5100 | 2.97 | 23.81 | 6.1 | 32.9 | 37.0 | -4.1 | 312 | 3.11 | |
| 930.8700 | 3.31 | 24.36 | 5.1 | 32.8 | 37.0 | -4.2 | 275 | 2.89 | |

Antenna Polarization: Vertical

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBµV) | Emission Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | AZ(°) | EL(m) |
|--------------------|-----------------------|-----------------------------|---------------------|-------------------------------|-------------------|----------------|-------|-------|
| 266.1400 | 1.93 | 12.56 | 14.0 | 28.5 | 37.0 | -8.5 | 115.0 | 1.00 |
| 375.0100 | 2.15 | 15.80 | 16.0 | 34.0 | 37.0 | -3.1 | 315.1 | 1.00 |
| 432.1700 | 2.61 | 16.65 | 13.7 | 33.0 | 37.0 | -4.0 | 83.20 | 1.00 |
| 531.9700 | 3.16 | 19.22 | 9.6 | 32.0 | 37.0 | -5.0 | 231.2 | 1.34 |
| 623.3600 | 3.42 | 20.94 | 8.4 | 32.8 | 37.0 | -4.2 | 110.8 | 2.15 |
| 665.7800 | 2.57 | 21.34 | 9.1 | 33.0 | 37.0 | -4.0 | 207.6 | 2.25 |

- 1. Measurement uncertainty is +/-4dB.
- 2. "*": Measurement does not apply for this frequency.
- 3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
- 4. The field strength of other emission frequencies were very low against the limit.



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Temperature: 26 °C Humidity: 63 %RH

Ferquency Range: 1 GHz – 12 GHz Measured Distance: 3m

Receiver Detector: PK. or AV. Tested Mode: N/A

Tested by: Lake Cheng Tested Date: Nov. 25, 2003

Antenna Polarization: Horizontal

| Frequency (MHz) | Correct Factor (dB) | Antenna Factor (dB/m) | Reading Data (dBµV) | | Emission Level (dBµV/m) | | Limit (dBµV/m) | | Margin (dB) | | AZ(°) | EL (m) |
|--------------------|---------------------------|-----------------------------|---------------------------|------|-------------------------------|------|-------------------|------|----------------|-------|-------|--------|
| | , , | | PK. | AV | PK. | AV | PK. | AV | PK. | AV | | |
| 1072.33 | -34.62 | 24.40 | 60.2 | 50.1 | 50.0 | 39.9 | 74.0 | 54.0 | -24.0 | -14.1 | 310.0 | 2.10 |
| 1446.87 | -29.85 | 25.18 | 55.2 | 47.0 | 50.5 | 42.3 | 74.0 | 54.0 | -23.5 | -11.7 | 61.0 | 2.30 |
| 2154.69 | -32.25 | 27.51 | 56.7 | 42.9 | 52.0 | 38.2 | 74.0 | 54.0 | -22.0 | -15.8 | 45.0 | 1.60 |
| 3061.58 | -32.11 | 31.18 | 50.4 | 44.8 | 49.5 | 43.9 | 74.0 | 54.0 | -24.5 | -10.1 | 119.0 | 1.50 |
| 3743.36 | -30.81 | 32.40 | 55.3 | 48.1 | 56.9 | 49.7 | 74.0 | 54.0 | -17.1 | -4.3 | 133.1 | 1.54 |
| 4192.98 | -30.10 | 32.72 | 57.1 | 43.3 | 59.7 | 45.9 | 74.0 | 54.0 | -14.3 | -8.1 | 215.3 | 1.32 |

Antenna Polarization: Vertical

| Frequency (MHz) | Correct Factor (dB) | Antenna Factor (dB/m) | Reading Data (dBµV) | | Emission Level (dBµV/m) | | Limit (dBµV/m) | | Margin (dB) | | AZ(°) | EL (m) |
|--------------------|---------------------------|-----------------------------|---------------------------|------|-------------------------------|------|-------------------|------|----------------|-------|-------|--------|
| | | | PK. | AV | PK. | AV | PK. | AV | PK. | AV | | |
| 1071.65 | -34.61 | 24.36 | 53.9 | 44.9 | 43.6 | 34.6 | 74.0 | 54.0 | -30.4 | -19.4 | 50.8 | 1.21 |
| 1278.12 | -33.74 | 24.81 | 51.1 | 41.3 | 42.2 | 32.4 | 74.0 | 54.0 | -31.8 | -21.6 | 15.0 | 1.00 |
| 2064.31 | -32.84 | 27.33 | 56.1 | 46.8 | 50.6 | 41.3 | 74.0 | 54.0 | -23.4 | -12.7 | 63.7 | 1.00 |
| 3167.25 | -31.82 | 31.50 | 55.8 | 48.1 | 55.5 | 47.8 | 74.0 | 54.0 | -18.5 | -6.2 | 87.3 | 1.60 |
| 3856.01 | -30.43 | 32.36 | 60.9 | 50.4 | 62.8 | 52.3 | 74.0 | 54.0 | -11.2 | -1.7 | 95.0 | 2.20 |
| 4681.70 | -30.53 | 33.54 | 53.5 | 47.3 | 56.5 | 50.3 | 74.0 | 54.0 | -17.5 | -3.7 | 68.0 | 2.00 |

NOTE: 1. Measurement uncertainty is less than 4dB

- 2. "*": Measurement does not apply for this frequency.
- 3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
- 4. The field strength of other emission frequencies were very low against the limit.
- 5. "-": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.



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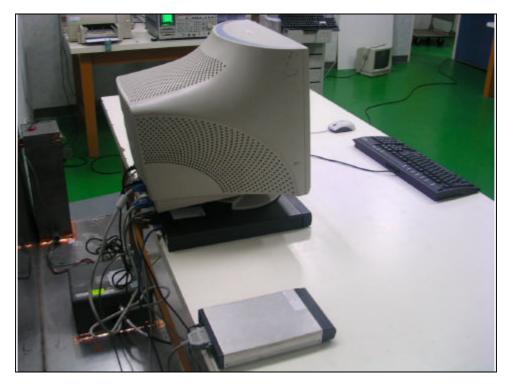
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6. PHOTOS OF TESTING

- Conducted test







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- Radiated test (Below 1GHz)







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- Radiated test (Above 1 GHz)







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7. TERMS OF ABRIVATION

| | _ |
|----------|--|
| AV. | Average detection |
| AZ(°) | Turn table azimuth |
| Correct. | Correction |
| EL(m) | Antenna height (meter) |
| EUT | Equipment Under Test |
| Horiz. | Horizontal direction |
| LISN | Line Impedance Stabilization Network |
| NSA | Normalized Site Attenuation |
| Q.P. | Quasi-peak detection |
| SRT Lab | Spectrum Research & Testing Laboratory, Inc. |
| Vert. | Vertical direction |