

# Certification of Compliance

CFR 47 Part 15 Subpart B

|                        |                                                      |                 |               |
|------------------------|------------------------------------------------------|-----------------|---------------|
| Test Report File No. : | 05-IST-0210                                          | Date of Issue : | June 15, 2005 |
| Model(s)               | : PE-14                                              |                 |               |
| Kind of Product        | : Powerline Ethernet Adapter                         |                 |               |
| FCC ID                 | : TCDPE-14                                           |                 |               |
| Applicant              | : KIT Co., Ltd.                                      |                 |               |
| Address                | : 168-26 Simi-Dong, Gumi-Si, GyeongsangBuk-Do, Korea |                 |               |
| Manufacturer           | : KIT Co., Ltd.                                      |                 |               |
| Address                | : 168-26 Simi-Dong, Gumi-Si, GyeongsangBuk-Do, Korea |                 |               |

## Test Result

☒ Positive

☐ Negative

Reviewed By

Approved By



S.J.Cho / EMC Group Manager



J.H.Lee / Chief

## Comment(s)

- Investigations requested : Measurement to the relevant clauses of FCC rules and regulations Part 15 Subpart B - Unintentional Radiators, Class B.
- The test report with appendix consists of 18 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.



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### ■ Test Conditions and Data - Emissions

|                                  |                   |            |
|----------------------------------|-------------------|------------|
| ◆ Conducted Emissions            | 535kHz - 1.705MHz | Applicable |
| Test Conditions / Data and Plots |                   | 9-11       |
| ◆ Radiated Emissions             | 9kHz - 30MHz      | Applicable |
| Test Conditions / Data and Plots |                   | 12-13      |
| ◆ Radiated Emissions             | 30MHz - 1GHz      | Applicable |
| Test Conditions / Data and Plots |                   | 12-13      |

|          |                                       |       |
|----------|---------------------------------------|-------|
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Note:

## 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          | 28.0 °C   |
| Humidity             | 45 %      |
| Atmospheric pressure | 1012 mbar |

## POWER SUPPLY SYSTEM USED

Power supply system      AC 120Vac, 60Hz  
(Refer to the product information)

## PRODUCT INFORMATION

**The Equipment Under Test(EUT) is Powerline Ethernet Adapter of KIT Co., LTD.  
(FCC ID : TCDPE-14)**

|                        |                       |
|------------------------|-----------------------|
| Power Source           | 100-240 Vac, 50/60 Hz |
| Protocol               | TCP/IP                |
| Media Interface        | RJ-45 for Ethernet    |
| Network Data Rate      | Up to 14 Mbps         |
| Security               | 56-bit DES Encryption |
| Dimensions (D x W x H) | 98.9 x 67.0 x 30.0 mm |

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

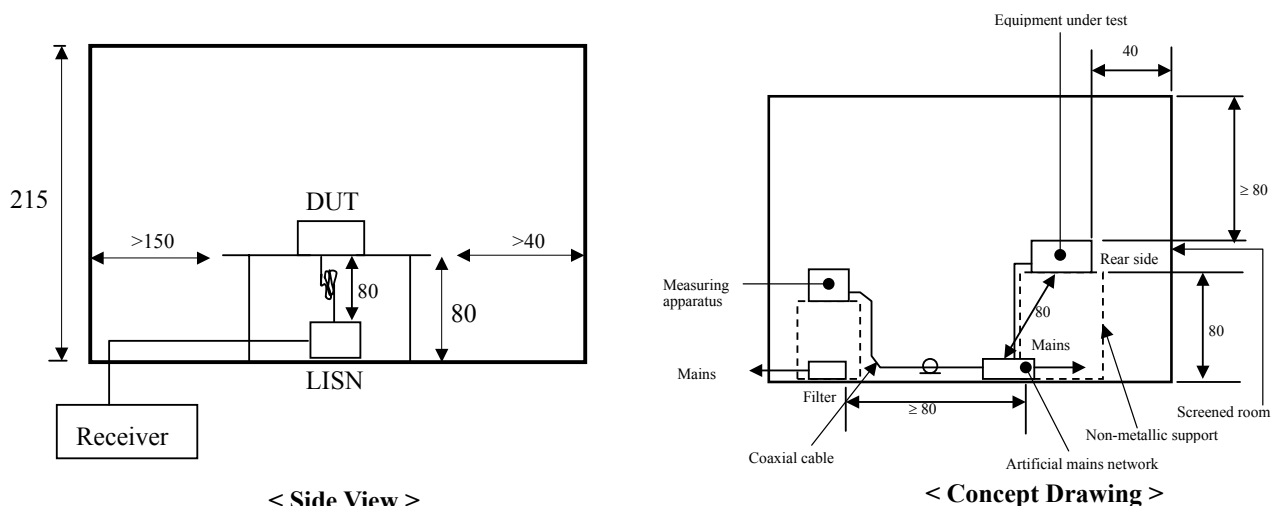
## DESCRIPTIONS OF TEST

### Conducted Emissions:

The measurement were performed over the frequency range of 0.15MHz to 30MHz using a 50 $\Omega$ /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 a bandwidth of 10KHz or for "quasi-peak" & "Average" 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 3725/2 and Hyup-Rip KNW-407 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 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  $\phi$  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.



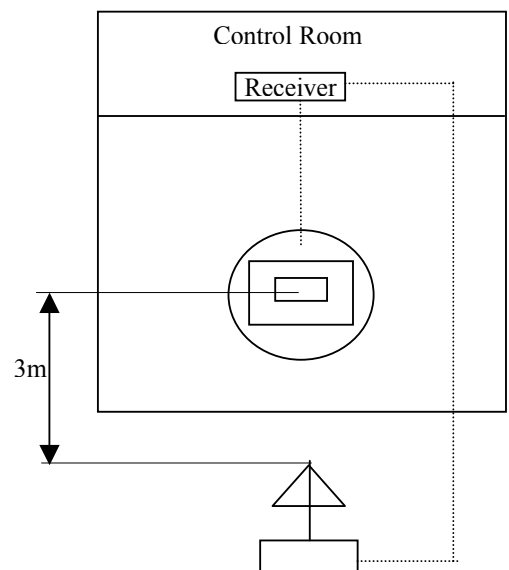
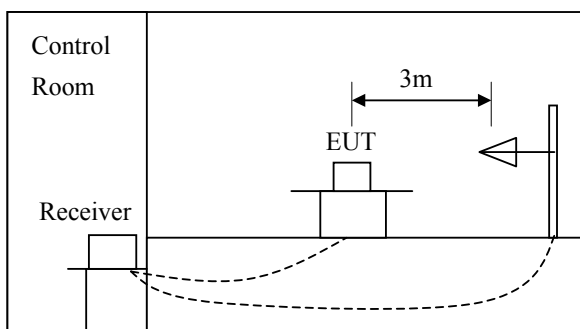
## DESCRIPTION OF TEST

### 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.

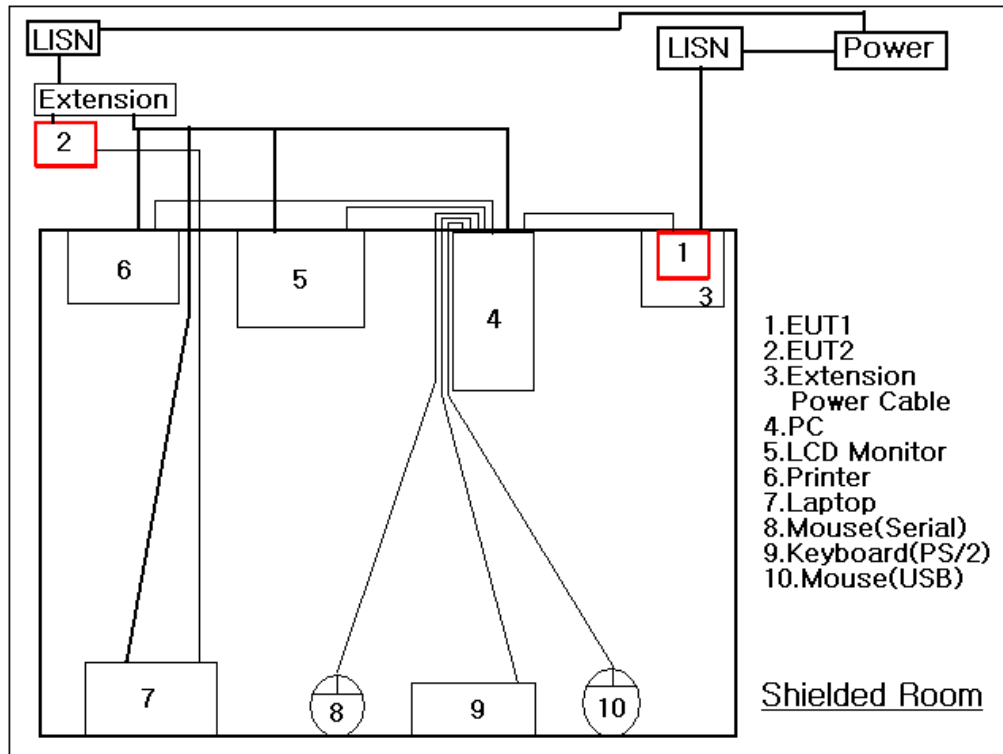
#### -Procedure of Test

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 30MHz to 1000MHz using S/B LogBicon antenna VL9160. Under 30MHz, magnetic loop antenna were used. Final measurements were made at open site with 3-meters test distance using the same antenna. The OATS have been verified in regular for its normalized site attenuation. 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.

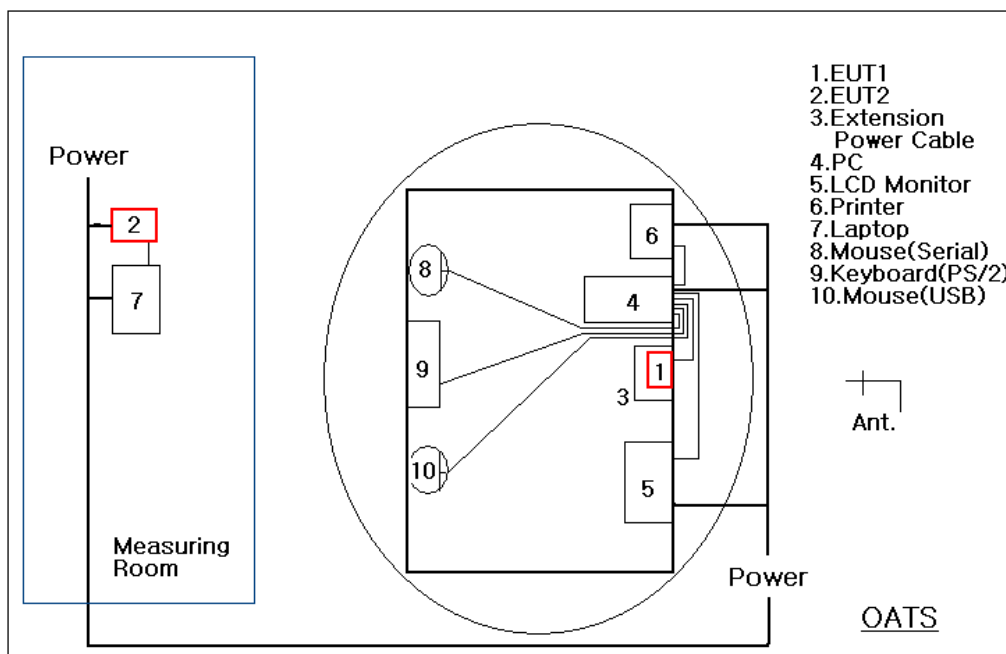




## Test Set-Up



Conducted Emissions



Radiated Emissions

## SUMMARY

### Emissions

#### ■ Conducted Emission

Test Rule Part 15.107(c)

The requirements are

● MET

○ Not MET

Minimum limit margin

26.8 dB at 0.664 MHz

Maximum limit exceeding

**Remarks : Limits are kept with more 3dB margin.**

Find the test data in following pages 9 to 10.

#### ■ Radiated Emission

Test Rule Part 15.109(a) (e)

The requirements are

● MET

○ Not MET

Minimum limit margin

3.2 dB at 300.0 MHz

Maximum limit exceeding

**Remarks : Limits are kept with more 3dB margin.**

Find the test data in following page 12.

### test Date

Begin of testing : June 13, 2005

End of testing : June 15, 2005

Note :

Prepared By



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

S.G.Kim / Senior Engineer

## TEST CONDITIONS AND DATA

### Conducted Emissions

[Applicable]

#### ◆ Test Equipment Used

| Model Name | Description   | Manufacture     | Calibration Date | Serial Number |
|------------|---------------|-----------------|------------------|---------------|
| ESH 3      | Test Receiver | Rohde & Schwarz | Jul. 15, 2004    | 892108/018    |
| 3725/2     | LISN          | Rohde & Schwarz | Jul. 15, 2004    | 9101-2068     |
| KNW-407    | LISN          | Hyup-Rip        | Jul. 15, 2004    | 8-833-10      |
| ESH 3-Z2   | Pulse limiter | Rohde & Schwarz | Jul. 15, 2004    | 357.8810.52   |

#### ◆ Test Accessories Used

| Type              | Manufacturer |
|-------------------|--------------|
| Aneroid Barometer | Sato         |
| Hygrometer        | Sato         |

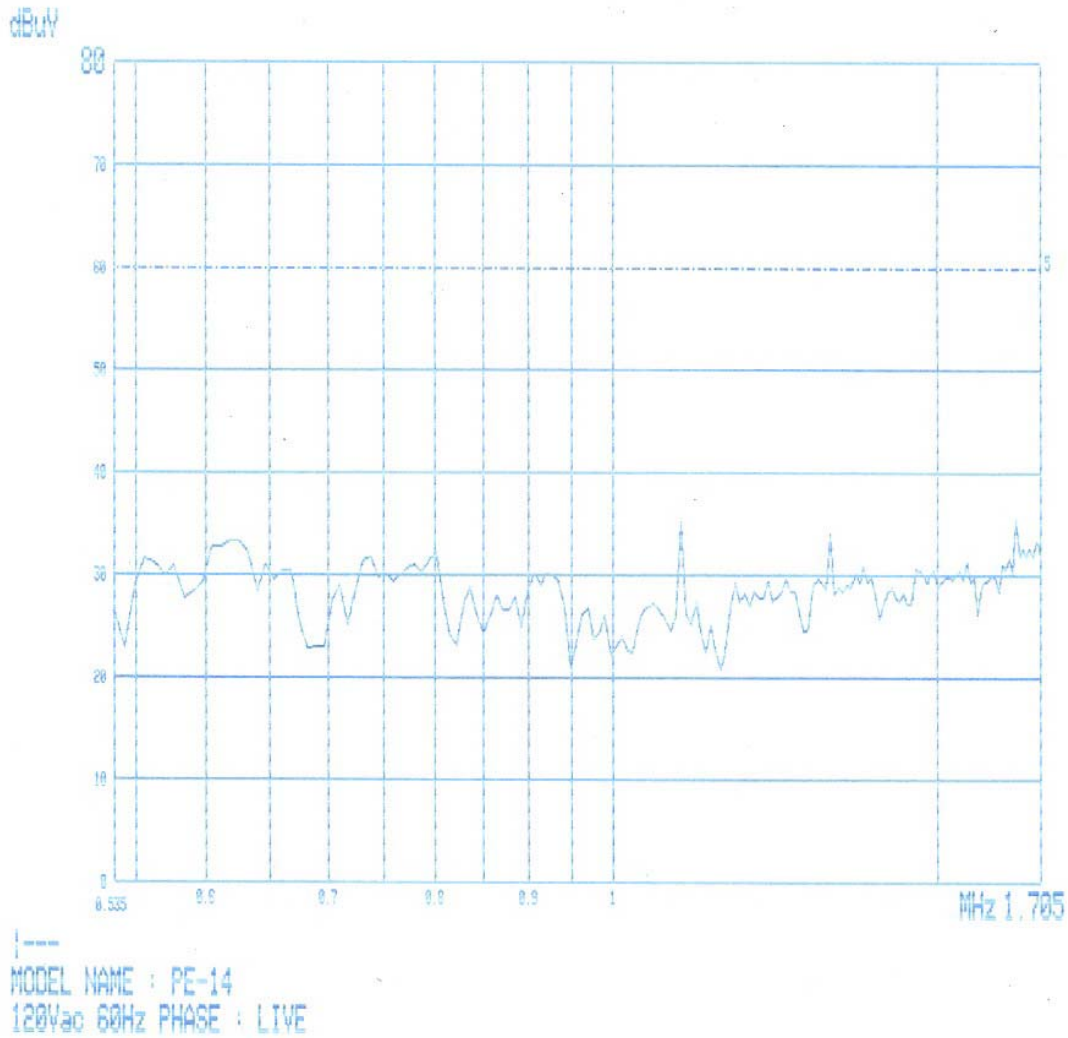
◆ Test Program                      Communication network monitoring mode (PING test)

◆ Test Date                          June 13, 2005

◆ Test Area                          Shielded Room No.1 (for Conducted Emission test)

Note :                      The equipment used is calibrated in regular for every year.

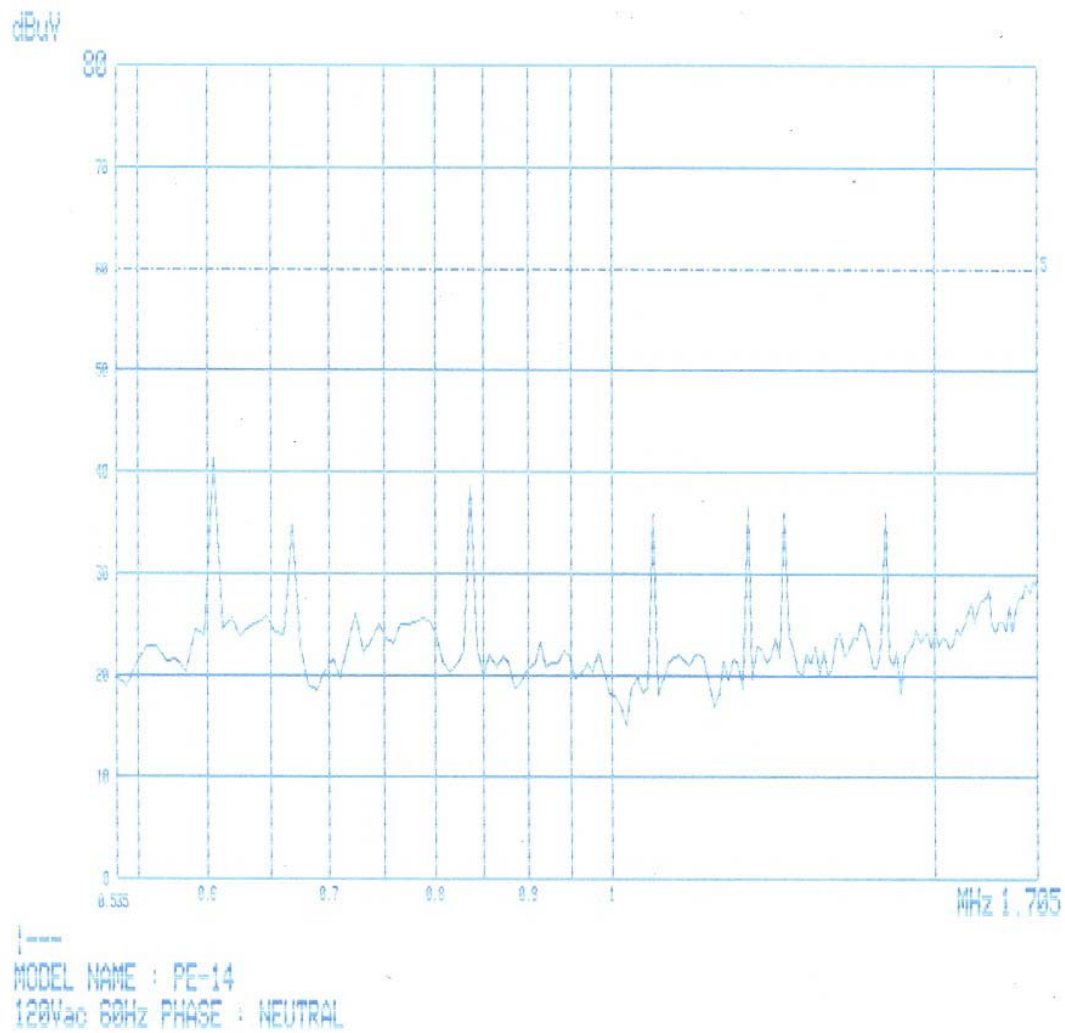
### Conducted Emissions



| Freq.<br>[MHz] | Measurement<br>[dB μV] |         | Limit<br>[dB μV] |         | Insertion<br>Loss<br>[dB] | Cable<br>Loss<br>[dB μV] | Result<br>[dB μV] |         | Margin<br>[dB] |         |
|----------------|------------------------|---------|------------------|---------|---------------------------|--------------------------|-------------------|---------|----------------|---------|
|                | Q-peak                 | Average | Q-peak           | Average |                           |                          | Q-peak            | Average | Q-peak         | Average |
| 0.619          | 30.3                   | -       | 60.0             | -       | 0.3                       | 0.4                      | 31.0              | -       | 29.0           | -       |
| 0.799          | 29.0                   | -       | 60.0             | -       | 0.3                       | 0.4                      | 29.7              | -       | 30.3           | -       |
| 0.934          | 25.4                   | -       | 60.0             | -       | 0.3                       | 0.4                      | 26.1              | -       | 33.9           | -       |
| 1.108          | 24.6                   | -       | 60.0             | -       | 0.3                       | 0.5                      | 25.4              | -       | 34.6           | -       |
| 1.341          | 27.2                   | -       | 60.0             | -       | 0.3                       | 0.5                      | 28.0              | -       | 32.0           | -       |
| 1.704          | 31.3                   | -       | 60.0             | -       | 0.3                       | 0.5                      | 32.1              | -       | 27.9           | -       |

Note :

### Conducted Emissions



| Freq.<br>[MHz] | Measurement<br>[dB $\mu$ V] |         | Limit<br>[dB $\mu$ V] |         | Insertion<br>Loss | Cable<br>Loss | Result<br>[dB $\mu$ V] |         | Margin<br>[dB] |         |
|----------------|-----------------------------|---------|-----------------------|---------|-------------------|---------------|------------------------|---------|----------------|---------|
|                | Q-peak                      | Average | Q-peak                | Average | [dB]              | [dB $\mu$ V]  | Q-peak                 | Average | Q-peak         | Average |
| 0.605          | 27.6                        | -       | 60.0                  | -       | 0.3               | 0.4           | 28.3                   | -       | 31.7           | -       |
| 0.664          | 32.5                        | -       | 60.0                  | -       | 0.3               | 0.4           | 33.2                   | -       | 26.8           | -       |
| 0.833          | 30.6                        | -       | 60.0                  | -       | 0.3               | 0.4           | 31.3                   | -       | 28.7           | -       |
| 1.088          | 31.2                        | -       | 60.0                  | -       | 0.3               | 0.5           | 32.0                   | -       | 28.0           | -       |
| 1.245          | 29.4                        | -       | 60.0                  | -       | 0.3               | 0.5           | 30.2                   | -       | 29.8           | -       |
| 1.415          | 28.8                        | -       | 60.0                  | -       | 0.3               | 0.5           | 29.6                   | -       | 30.4           | -       |

Note :

## TEST CONDITIONS AND DATA

### Radiated Emission

[Applicable]

#### ◆ Test Equipment Used

| Name      | Type                       | Manufacturer    | Calibration Date | Serial Number |
|-----------|----------------------------|-----------------|------------------|---------------|
| ESCS30    | Test Receiver              | Rohde & Schwarz | Aug. 18, 2004    | 100171        |
| VULB 9160 | LogBicon Ant.              | Schwarzbeck     | Jul. 10, 2004    | 3047          |
| HFH2-Z2   | Magnetic Loop Ant.         | Rohde & Schwarz | Aug. 18, 2004    | 335.4711.52   |
| 5906      | Ant. Turn Table Controller | Tokin           | N/A              | 927221        |
| 5907      | Ant. Turn Table Driver     | Tokin           | N/A              | 917221        |
| HFU-Z     | Tripod                     | Rohde & Schwarz | N/A              | 110.1114.02   |

#### ◆ Test Accessories Used

| Type              | Manufacturer |
|-------------------|--------------|
| Aneroid Barometer | Sato         |
| Hygrometer        | Sato         |

◆ Test Program            Communication network monitoring mode (PING test)

◆ Test Date                June 14, 2005

◆ Test Area                Open Area Test Site   No.2

*Note : The equipment used is calibrated in regular for every year.*

### Radiated Emissions

| Mode      | Freq.<br>[MHz] | Reading<br>[dBuV] | Antenna<br>Factor<br>[dB/m] | Cable<br>Loss<br>[dB] | Polar.<br>[H/V] | Result<br>[dBuV/m] | Limit<br>[dBuV/m] | Margin<br>[dB] |
|-----------|----------------|-------------------|-----------------------------|-----------------------|-----------------|--------------------|-------------------|----------------|
| PING test | 6.2            | 18.2              | 20.0                        | 0.6                   | V               | 38.8               | 49.5              | 10.7           |
|           | 8.1            | 17.7              | 20.0                        | 0.6                   | V               | 38.3               | 49.5              | 11.2           |
|           | 9.4            | 19.5              | 20.0                        | 0.6                   | V               | 40.1               | 49.5              | 9.4            |
|           | 12.5           | 22.1              | 20.0                        | 0.6                   | V               | 42.7               | 49.5              | 6.8            |
|           | 15.9           | 19.0              | 20.0                        | 0.7                   | V               | 39.7               | 49.5              | 9.8            |
|           | 17.8           | 20.3              | 20.0                        | 0.7                   | V               | 41.0               | 49.5              | 8.5            |
|           | 25.0           | 22.6              | 20.0                        | 0.7                   | V               | 43.3               | 49.5              | 6.2            |
|           | 50.0           | 20.7              | 12.1                        | 1.6                   | V               | 34.4               | 40.0              | 5.6            |
|           | 75.0           | 20.0              | 8.8                         | 1.9                   | V               | 30.7               | 40.0              | 9.3            |
|           | 150.0          | 13.8              | 12.9                        | 2.9                   | V               | 29.6               | 43.5              | 13.9           |
|           | 200.0          | 16.8              | 9.2                         | 3.3                   | V               | 29.3               | 43.5              | 14.2           |
|           | 250.0          | 25.9              | 11.0                        | 3.9                   | V               | 40.8               | 46.0              | 5.2            |
|           | 300.0          | 25.9              | 12.5                        | 4.4                   | H               | 42.8               | 46.0              | 3.2            |
|           | 350.0          | 23.6              | 13.8                        | 4.8                   | V               | 42.2               | 46.0              | 3.8            |
|           | 400.0          | 22.5              | 14.5                        | 5.2                   | V               | 42.2               | 46.0              | 3.8            |
|           | 450.0          | 20.0              | 16.1                        | 5.6                   | V               | 41.7               | 46.0              | 4.3            |
|           | 500.0          | 19.5              | 16.9                        | 6.0                   | V               | 42.4               | 46.0              | 3.6            |
|           | 600.0          | 16.8              | 18.8                        | 6.7                   | V               | 42.3               | 46.0              | 3.7            |
|           | 700.0          | 15.0              | 20.3                        | 7.3                   | H               | 42.6               | 46.0              | 3.4            |
|           | 800.0          | 11.7              | 22.5                        | 8.1                   | H               | 42.3               | 46.0              | 3.7            |
|           |                |                   |                             |                       |                 |                    |                   |                |

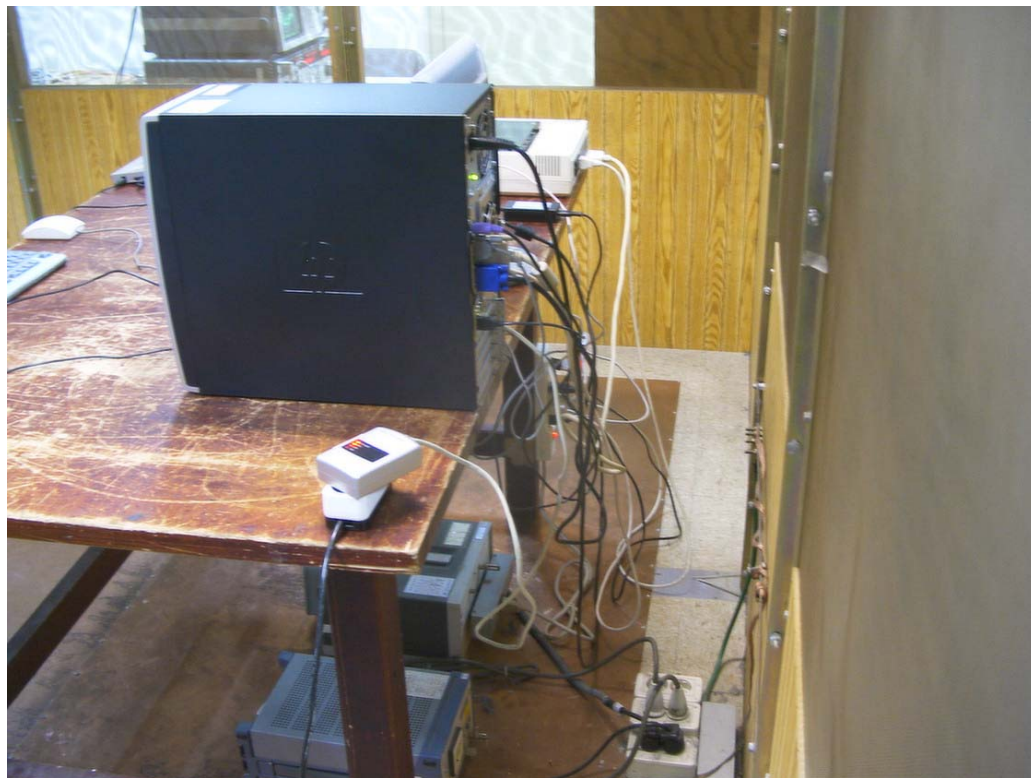
**Note :**

- The measurement was performed for the frequency range 9 kHz ~ 30 MHz according to the section 15.109(e) requirement.
- The loop antenna was positioned with its plane vertical at 3 m fro the EUT and rotated about its vertical axis for maximum emission at each azimuth about the EUT.
- The above table shows the highest levels of radiated emissions on both polarization of horizontal and vertical.

**Appendix A. The Photos of Test Setup**



**Conducted Emissions - Front View**

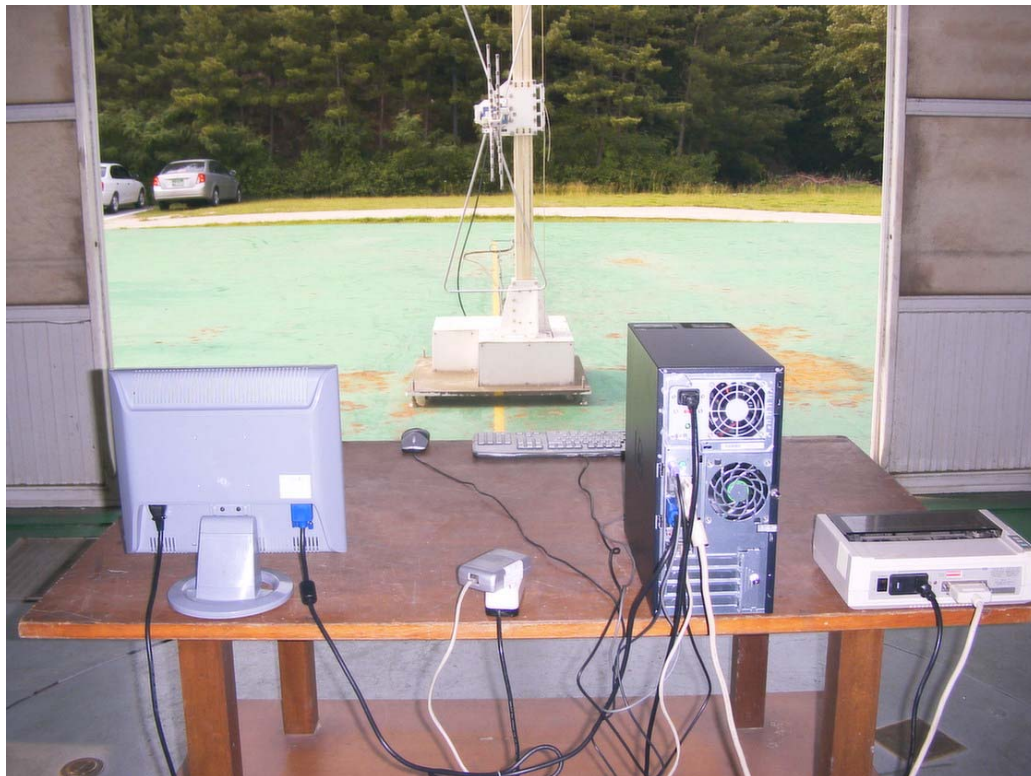


**Conducted Emissions - Rear View**

**Appendix A. The Photos of Test Setup**



**Radiated Emissions (30MHz-1GHz) - Front View**

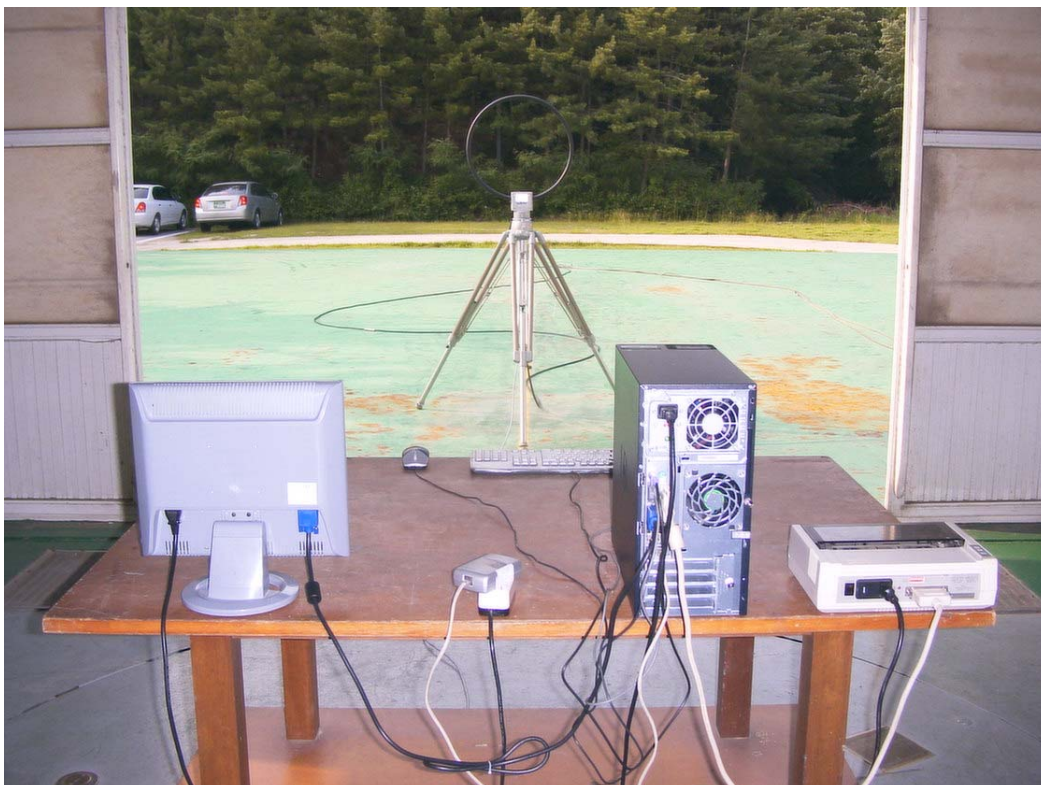


**Radiated Emissions (30MHz-1GHz) - Rear View**

**Appendix A. The Photos of Test Setup**



**Radiated Emissions (9kHz-30MHz) - Front View**



**Radiated Emissions (9kHz-30MHz) - Rear View**

**Appendix B. The Photos of EUT**



**Front View**

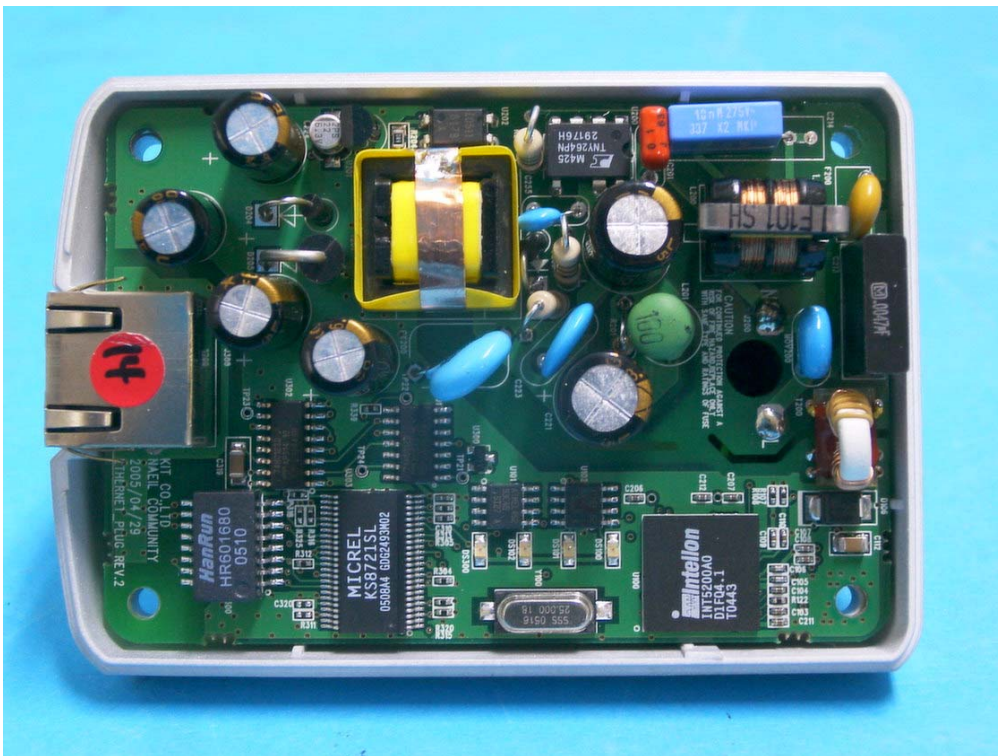


**Rear View**

Appendix B. The Photos of EUT



Interface Port (Ethernet)



Inner View