



EMC RESEARCH INSTITUTE



# EMI TEST REPORT

## Emission of electromagnetic disturbance

**Test Report No.** : ERI-FCC04-0002  
**Equipment** : DIGITAL VOICE RECORDER  
**Name of basic model** : WVR-175  
**Family model** : WVR-185  
**Manufacturer** : CENIX DIGICOM CO., LTD.  
**Applicant** : CENIX DIGICOM CO., LTD.  
**Tested date** : 2004. 1.13 – 1.14  
**Issued date** : 2004. 1. 14  
**Test results** : PASS  
**Test Standards** : FCC Part 15 Subpart B (Class B)  
/digital devices & peripherals

### Test Procedure and Items:

- AC Power line Conducted emissions measurement : ANSI C63.4-1992
- Radiated emissions measurement : ANSI C63.4-1992

**Tested by: GWEON, HUR**

**Approved by: SANG-KYU, LEE**

The results in this report apply only to the sample tested.

This test report shall not be reproduced except in full, without the written approval of **ERI Laboratory**.

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## APPENDIX

(None)

## 1. CLIENT INFORMATION

The EUT has been tested by request of :

Company : CENIX DIGICOM CO., LTD.  
Address : #584-4 PAJANG-DONG, JANGAN-KU, SUWON-CITY,  
KYUNGGI-DO, KOREA  
Name of contact : Keun-Woo, Park  
Telephone : +82-31-245-2900  
Facsimile : +82-31-251-6425

## 2. LABORATORY INFORMATION

The 10m full-anechoic chamber and/or EMC facilities are used for these testing.  
These facilities were accredited by KOLAS, EK, MIC of Korea and FCC of USA.

### Address

ELECTROMAGNETIC RESEARCH INSTITUTE.  
66-6, JEIL-RI, YANGJI-MYUN, YOUNGIN-CITY, KYUNGGI-DO, KOREA

Telephone No. : +82-31-336-1186~7  
Facsimile No. : +82-31-336-1184

### Registered No.

KOLAS : 111  
EK : J  
MIC : KR0030  
FCC Filing No. : 302567

## 3. EQUIPMENT UNDER TEST INFORMATION(EUT)

### 3.1 Identification of the EUT

Type of equipment : DIGITAL VOICE RECORDER  
Model name : WVR-175  
Brand name : -  
Manufacturer : CENIX DIGICOM CO., LTD.  
Address : #584-4 PAJANG-DONG, JANGAN-KU, SUWON-CITY,  
KYUNGGI-DO, KOREA  
Telephone : +82-31-245-2900  
Facsimile : +82-31-251-6425  
Country of origin : KOREA  
Rating : DC 3V

### 3.2 Additional information about the EUT

Class B,

Family Models List:

|               | Name    | Different point |        |
|---------------|---------|-----------------|--------|
|               |         | Color           | Memory |
| Basic Model   | WVR-175 | Silver          | 32M    |
| Variant Model | WVR-185 | Gold            | 64M    |

### 3.3 Peripheral equipment

Defined as equipment needed for correct operation of the EUT.

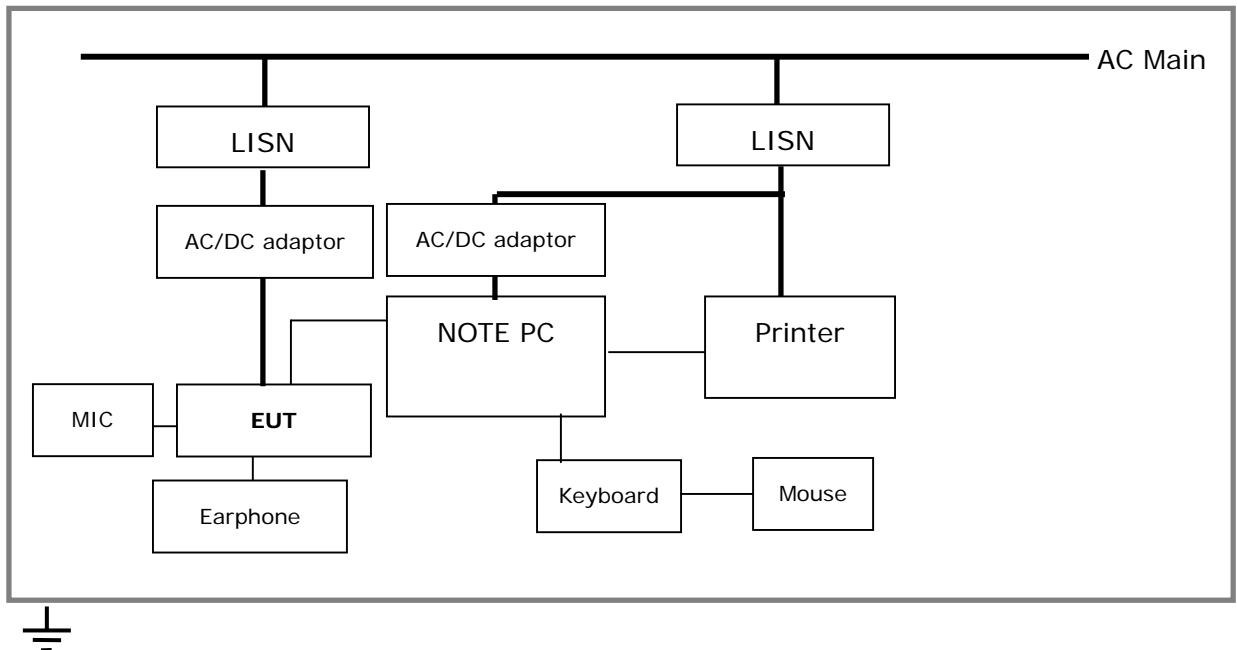
| Description   | Model No. | Serial No.   | Manufacture                       |
|---------------|-----------|--------------|-----------------------------------|
| Printer       | C6427A    | CN13V1B1SZ   | HP                                |
| NOTE PC       | CM2080    | 5Y17JNZ9R622 | LG                                |
| AC/DC adaptor | ADP-60DB  | 3141BS0035A  | DELTA<br>ELECTRONICS CO.,<br>LTD. |
| Earphone      | -         | -            | -                                 |
| Mic           | -         | -            | -                                 |
| AC/DC adaptor | AD 600    | -            | -                                 |
| Mouse         | M-U48a    | LZCI0I52001  | Samsung                           |
| Keyboard      | SDM45I0UH | 4M030902     | Samsung                           |

#### 4. CONTINUOUS DISTURBANCE VOLTAGE, MAIN TERMINAL : Frequency range 0.15 MHz to 30 MHz

##### 4.1 Operating environment

Temperature : 22.0  
Relative Humidity : 32.0 %

##### 4.2 Test set-up and test procedures



The mains terminal disturbance voltage was measured with the equipment under test(EUT) in a shield room. The EUT was connected to an artificial mains network(LISN) placed on the floor. The EUT was placed on non-metallic table 0.4m above the metallic, grounded floor. The distance to other metallic surface was at least 0.8m.

Amplitude measurements were performed with a quasi-peak detector and an average detector.

##### 4.3 Operation Conditions

Upload mode, play mode

##### 4.4 Test instrument

| Instrument    | Model No       | Serial No. | Makers | Next cal.date | Used |
|---------------|----------------|------------|--------|---------------|------|
| Test receiver | ESCS30         | 100021     | R&S    | 2005. 1. 24   |      |
| L.I.S.N.      | ESH3-Z5        | 827246/008 | R&S    | 2004. 3. 19   |      |
|               | ESH3-Z5        | 831887/018 | R&S    | 2004. 3. 19   |      |
| Shield room   | 8 × 6 × 3.3m/H | -          | -      | -             |      |

#### 4.5 Test results(Test mode: Upload mode)

Date of test: Jun 14, 2004

An overview sweep performed with peak detector & average detector are included in the report **as test reports**.

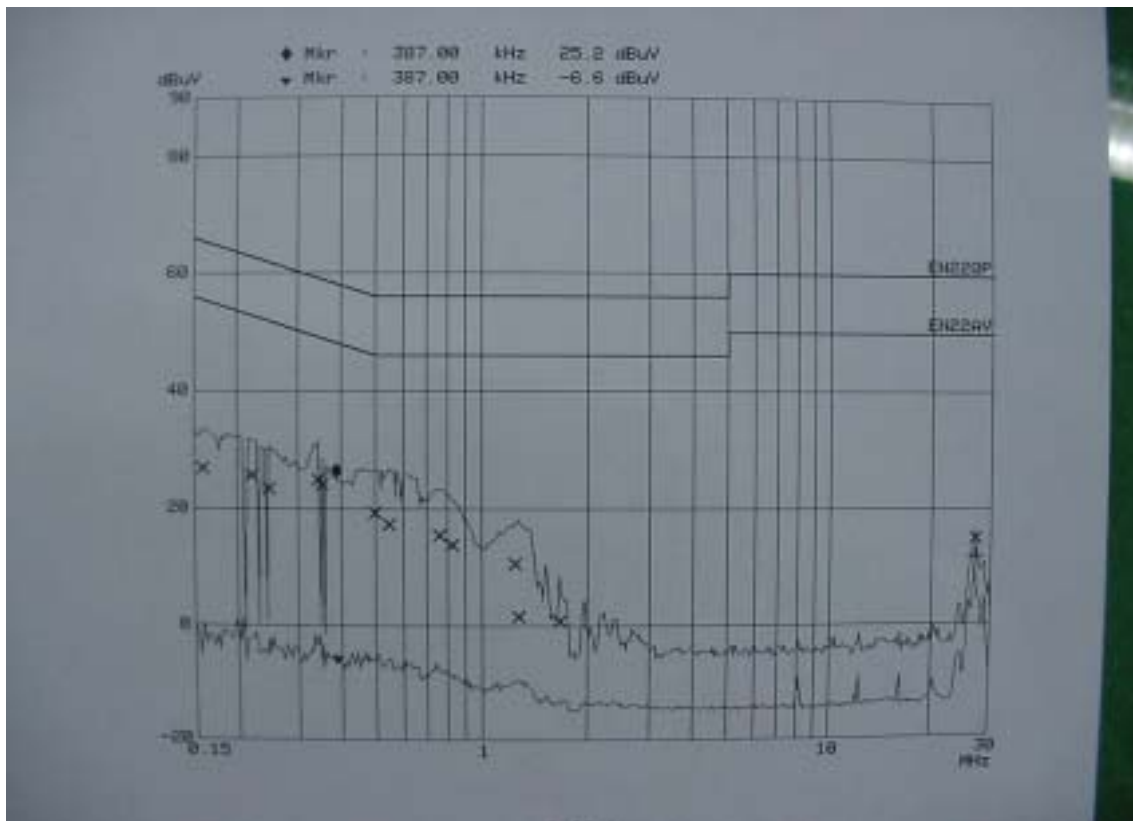
| Frequency                 | Tested | LISN | Meter   |      | Limits |      |
|---------------------------|--------|------|---------|------|--------|------|
| Range                     | Freq.  |      | Reading |      |        |      |
|                           |        |      | QP      | AV   | QP     | AV   |
| [MHz]                     | [MHz]  |      | [dBuV]  |      | [dBuV] |      |
| <i>0.15<br/>- 30(MHz)</i> | 0.159  | N    | 30.7    | <5   | 65.5   | 55.5 |
|                           | 0.213  | N    | 27.0    | <5   | 63.1   | 53.1 |
|                           | 0.348  | N    | 25.7    | <5   | 59.0   | 49.0 |
|                           | 0.351  | N    | 25.6    | <5   | 58.9   | 48.9 |
|                           | 0.732  | N    | 18.0    | <5   | 56.0   | 46.0 |
|                           | 1.248  | N    | 13.4    | <5   | 56.0   | 46.0 |
|                           | 1.311  | N    | 13.9    | <5   | 56.0   | 46.0 |
|                           | 26.94  | H    | 15.0    | 11.8 | 60.0   | 50.0 |
|                           |        |      |         |      |        |      |
|                           |        |      |         |      |        |      |

<5 : mean less than 5dB

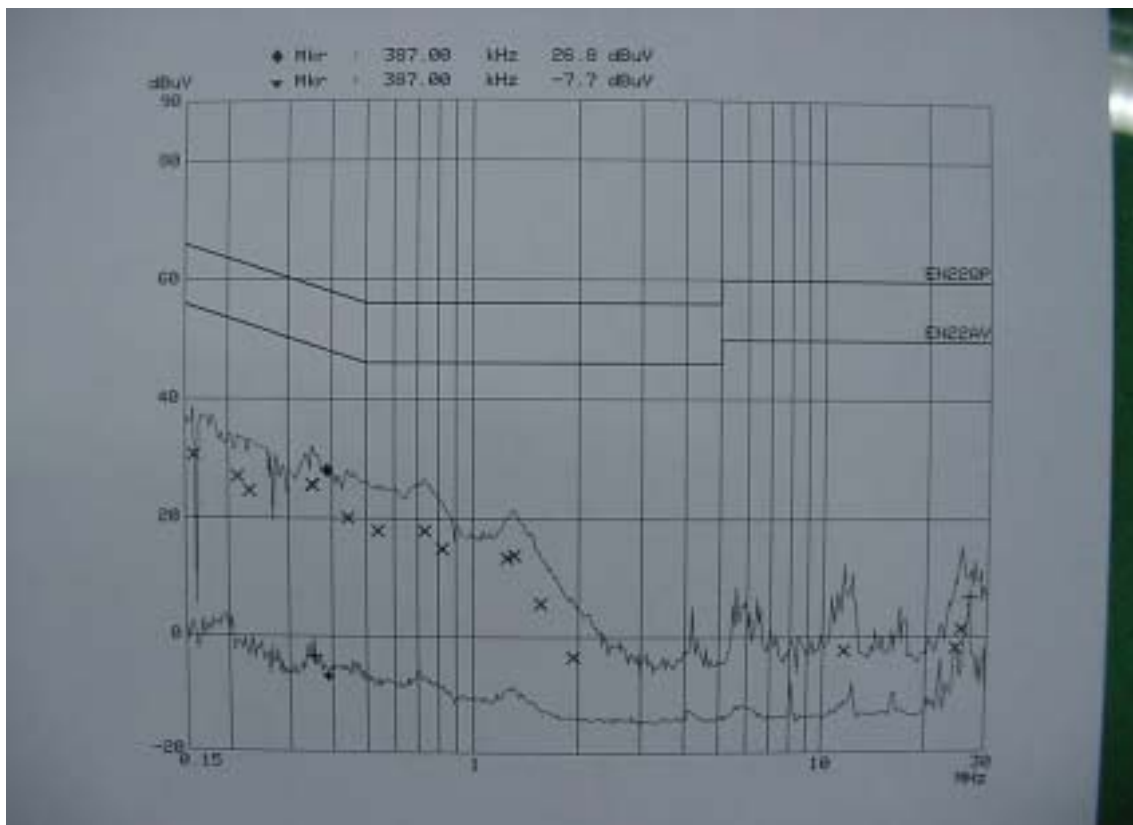
Other frequency keep over 20dB margin.

#### Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.



[Live line]



[Neutral line]

#### 4.6 Test results(Test mode: Play mode)

Date of test: Jan 14, 2004

An overview sweep performed with peak detector & average detector are included in the report **as test reports**.

| Frequency                 | Tested | LISN | Meter   |      | Limits |      |
|---------------------------|--------|------|---------|------|--------|------|
| Range                     | Freq.  |      | Reading |      |        |      |
|                           |        |      | QP      | AV   | QP     | AV   |
| [MHz]                     | [MHz]  |      | [dBuV]  |      | [dBuV] |      |
| <b>0.15<br/>- 30(MHz)</b> | 0.168  | N    | 27.1    | <5   | 65.1   | 55.1 |
|                           | 0.189  | N    | 26.2    | <5   | 64.1   | 54.1 |
|                           | 0.339  | N    | 23.0    | <5   | 59.2   | 49.2 |
|                           | 0.483  | N    | 17.4    | <5   | 56.3   | 46.3 |
|                           | 0.537  | N    | 16.0    | <5   | 56.0   | 46.0 |
|                           | 0.822  | H    | 13.4    | <5   | 56.0   | 46.0 |
|                           | 1.269  | H    | 11.0    | <5   | 56.0   | 46.0 |
|                           | 26.68  | N    | 13.1    | 11.0 | 60.0   | 50.0 |
|                           | 26.94  | H    | 14.7    | 11.4 | 60.0   | 50.0 |
|                           |        |      |         |      |        |      |

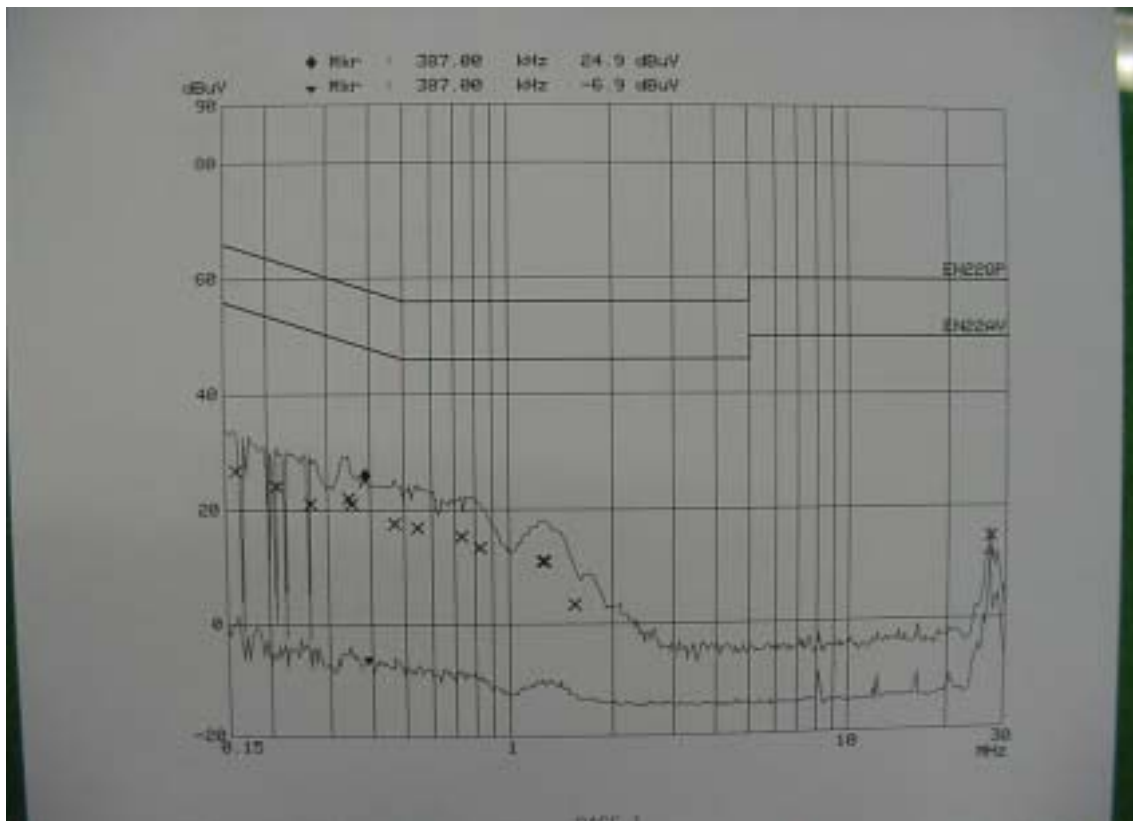
<5 : mean less than 5dB

Other frequency keep over 20dB margin.

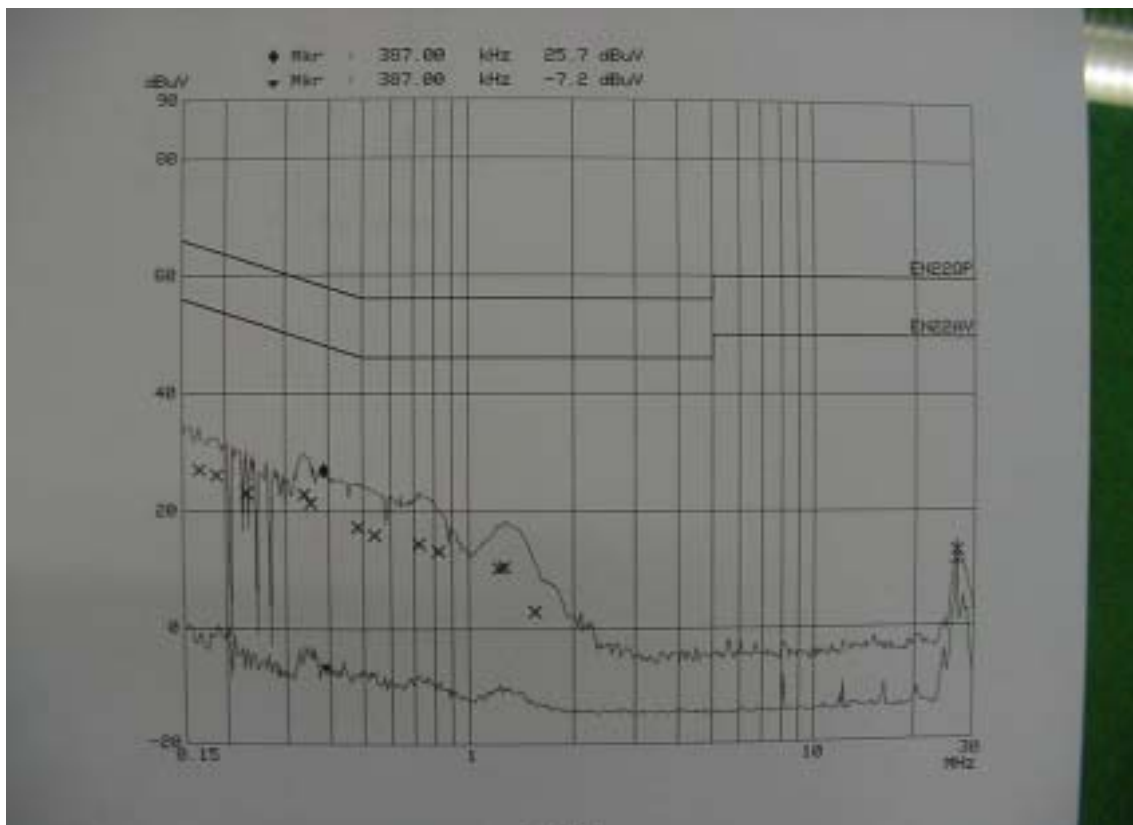
#### Result: Pass

The measured emissions level of the EUT have found the below of the specified limit.





[Live line]



[Neutral line]

## 5. RADIATED DISTURBANCE : 30MHz – 1000MHz

### 5.1 Operating environment

Temperature : 22.0  
Relative Humidity : 33 %

### 5.2 Test set-up

The frequency range investigated was 30 MHz to 1000 MHz.

All readings are quasi-peak unless stated otherwise.

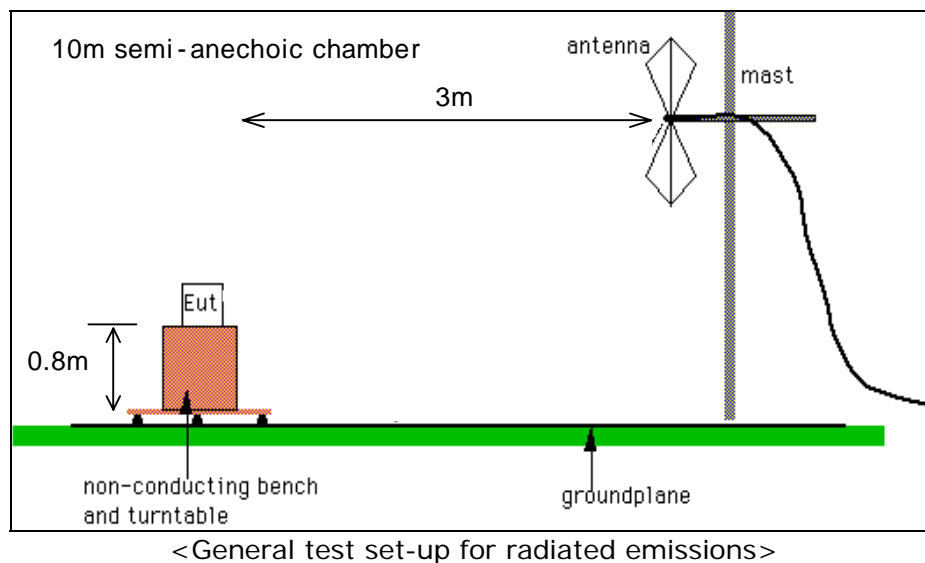
The half-wave dipole antenna was tuned to the frequency found during Preliminary radiated measurements. The EUT, support equipment and Interconnecting cables were re-configured to the set-up to the producing the Maximum emission for the frequency and were placed on top of a 0.8 meter High non-metallic 1 X 1.5 meter table. The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME 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.

And this device(EUT) was tested in 3 orthogonal planes.

The antenna measured both horizontal and vertical polarization.



### 5.3 Operation Conditions

Download mode, play mode, recording mode.

#### 5.4 Test instrument

| Instrument           | Model No.  | Serial No. | Makers      | Next cal.date | Used |
|----------------------|------------|------------|-------------|---------------|------|
| Test receiver        | ESCS30     | 100021     | R&S         | 2005. 1. 24   |      |
| L.I.S.N.             | ESH3-Z5    | 827246/008 | R&S         | 2004. 3. 19   |      |
|                      | ESH3-Z5    | 831887/018 | R&S         | 2004. 3. 19   |      |
| Biconical Antenna    | VHA9103    | 91031950   | Schwarzbeck | 2005.01.24    |      |
| Log-Periodic Antenna | UHALP9108A | 0392       | Schwarzbeck | 2005.01.23    |      |
| Antenna Mast         | MA240      | N/A        | HD          | -             |      |
| Turn Table           | DT430S     | N/A        | HD          | -             |      |

#### 5.5 Test results(Test mode: download mode)

Date of test: Jan 13, 2004

| Tested Frequency | ANT Pol. | Meter Reading   | Antenna Factor | Cable Loss  | Results             | Limits   |
|------------------|----------|-----------------|----------------|-------------|---------------------|----------|
| [MHz]            |          | [A]<br>[dBuV/m] | [B]<br>[dB]    | [C]<br>[dB] | [A+B+C]<br>[dBuV/m] | [dBuV/m] |
| 176.25           | V        | 16.50           | 15.90          | 2.50        | 34.90               | 43.50    |
| 198.90           | H        | 16.70           | 16.29          | 2.80        | 35.79               | 43.50    |
| 212.10           | H        | 15.40           | 16.50          | 2.80        | 34.70               | 43.50    |
| 294.20           | V        | 14.10           | 19.13          | 3.40        | 36.63               | 46.00    |
| 398.75           | H        | 17.00           | 15.87          | 4.20        | 37.07               | 46.00    |
| 606.10           | H        | 10.70           | 18.88          | 5.20        | 34.78               | 46.00    |
| 665.90           | H        | 13.20           | 19.50          | 5.20        | 37.90               | 46.00    |
| 732.75           | V        | 11.60           | 20.19          | 5.60        | 37.39               | 46.00    |
|                  |          |                 |                |             |                     |          |
|                  |          |                 |                |             |                     |          |
|                  |          |                 |                |             |                     |          |
|                  |          |                 |                |             |                     |          |

\* Receiving Antenna Mode : *Horizontal, Vertical*

\* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization → POL H = Horizontal  
POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result =  
Field Strength( AF + CL+ Reading)

**Result: Pass**

The measured emissions level of the EUT have found the below of the specified limit.

### 5.6 Test results < Test mode: Play mode >

Date of test: Jan 13, 2004

| Tested Frequency<br>[MHz] | ANT Pol. | Meter Reading<br>[A]<br>[dBuV/m] | Antenna Factor<br>[B]<br>[dB] | Cable Loss<br>[C]<br>[dB] | Results<br>[A+B+C]<br>[dBuV/m] | Limits<br>[dBuV/m] |
|---------------------------|----------|----------------------------------|-------------------------------|---------------------------|--------------------------------|--------------------|
| 212.24                    | H        | 10.70                            | 16.50                         | 2.80                      | 30.00                          | 43.50              |
| 294.10                    | H        | 12.50                            | 19.13                         | 3.40                      | 35.03                          | 46.00              |
| 367.30                    | H        | 14.80                            | 15.17                         | 4.00                      | 33.97                          | 46.00              |
|                           |          |                                  |                               |                           |                                |                    |
|                           |          |                                  |                               |                           |                                |                    |

\* Receiving Antenna Mode : *Horizontal, Vertical*

\* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization → POL H = Horizontal  
POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result =  
Field Strength( AF + CL + Reading)

**Result: Pass**

The measured emissions level of the EUT have found the below of the specified limit.

### 5.7 Test results < Test mode: Recording mode >

Date of test: Jan 13, 2004

| Tested Frequency<br>[MHz] | ANT Pol. | Meter Reading<br>[A]<br>[dBuV/m] | Antenna Factor<br>[B]<br>[dB] | Cable Loss<br>[C]<br>[dB] | Results<br>[A+B+C]<br>[dBuV/m] | Limits<br>[dBuV/m] |
|---------------------------|----------|----------------------------------|-------------------------------|---------------------------|--------------------------------|--------------------|
| 149.10                    | H        | 12.10                            | 14.99                         | 2.40                      | 29.49                          | 43.50              |
| 294.35                    | H        | 13.40                            | 19.13                         | 3.40                      | 35.93                          | 46.00              |
| 367.25                    | H        | 17.30                            | 15.17                         | 4.00                      | 36.47                          | 46.00              |
| 513.90                    | H        | 14.50                            | 17.34                         | 4.30                      | 36.14                          | 46.00              |
|                           |          |                                  |                               |                           |                                |                    |

\* Receiving Antenna Mode : *Horizontal, Vertical*

\* <5 : mean less than 5dB

Note : Reading = Test Receiver meter, P= Polarization → POL H = Horizontal  
POL V = Vertical A = Angle, AF = Antenna Factor CL = Cable Loss Result =  
Field Strength( AF + CL + Reading)

**Result: Pass**

The measured emissions level of the EUT have found the below of the specified limit.