



## EMISSION TEST REPORT

Test report file No. : **01-IST-099/FB** Date of issue : Aug. 07, 2001.

Model / Type No. : DAH-300

Kind of product : MP3 Player

Applicant : Hyun Won Inc.

Manufacturer : Hyun Won Inc.

Address : 333-1, Shindae-Ri, Kumho-Eup, Youngcheon-City, Kyoungbuk, Korea.

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

☒ Positive ☐ Negative

at page 3.

This test report without appendix consists of 17 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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| Environmental Conditions | <u>3</u>   |
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### B) Test Data.

|                             |                    |              |
|-----------------------------|--------------------|--------------|
| Conducted emissions (Mains) | : 450 kHz - 30 MHz | <u>10~12</u> |
| Radiated emissions          | : 30 MHz – 1 GHz   | <u>13~16</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.

## Product Information

- Power rating : DC 1.5V [AAA size 1.5V x 1 Alkaline battery]
- Brand name : Gemboy
- Manufactured by : Hyun Won Inc.
- Contact person : Taek Kyun, Shin / General Manager

## 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     | Jun. 11, 2001            | 861742/018           |
| ■ 3825/2    | LISN          | EMCO                | Dec. 20, 2000            | 9102-1788            |
| ■ KNW-407   | LISN          | HyupRip             | Jul. 26, 2001            | 8-833-10             |
| ■ ESH 3-Z2  | Pulse Limiter | Rohde & Schwarz     | Jul. 13, 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     | Jun. 12, 2001            | 861744/004           |
| ■ VULB 9160 | Antenna       | Schwarzbeck         | Jun. 04, 2001            | 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 **MP3 Player of Hyun Won Inc. (FCC ID: PCMDAH300).**

|                       |                                                                       |
|-----------------------|-----------------------------------------------------------------------|
| Flash Memory          | 64MB On-board(expandable to 128MB though)<br>MultiMediaCard(MMC) Slot |
| Size                  | 75X 56 X 19 (mm)                                                      |
| Battery               | DC 1.5V [AAA size 1.5V x 1 Alkaline battery]                          |
| Battery Life          | Approximately 10 hours of playback time                               |
| Signal to Noise Ratio | 90dB                                                                  |
| Interface Port        | Universal Serial Bus(USB)                                             |
| File Download Speed   | Up to 2.5 Mbps internal memory, 900Kbps MMC                           |

### 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

■ Operational Condition :

- Download files from PC to EUT
- Play Mode

### Configuration of the equipment under test :

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

| Equipment | Type        | Brand  | Serial No            | FCC ID    |
|-----------|-------------|--------|----------------------|-----------|
| Laptop    | ARMADA E500 | COMPAQ | AE5 P3600T4X12DC6458 | DoC       |
| Mouse     | M-S48a      | HP     | LZE01000039          | JNZ201213 |

- Unshielded AC power cable : 1.8 m
- USB I/O cable(with core) : 1.5m
- Earphone cable : 0.85 m

## TEST RESULT

### Download Mode :

#### Conducted emissions : 450 kHz - 30 MHz

The requirements are.

■ KEPT NOT KEPT

Min. limit margin

14.2 dB at 12.8354 MHz

Remarks : See test-graph to be attached at pages 11~12.

#### Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are

■ KEPT NOT KEPT

Min. limit margin

7.0 dB at 264.0 MHz

Remarks : See test-data at page 13~14.

### Play Mode :

#### Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are

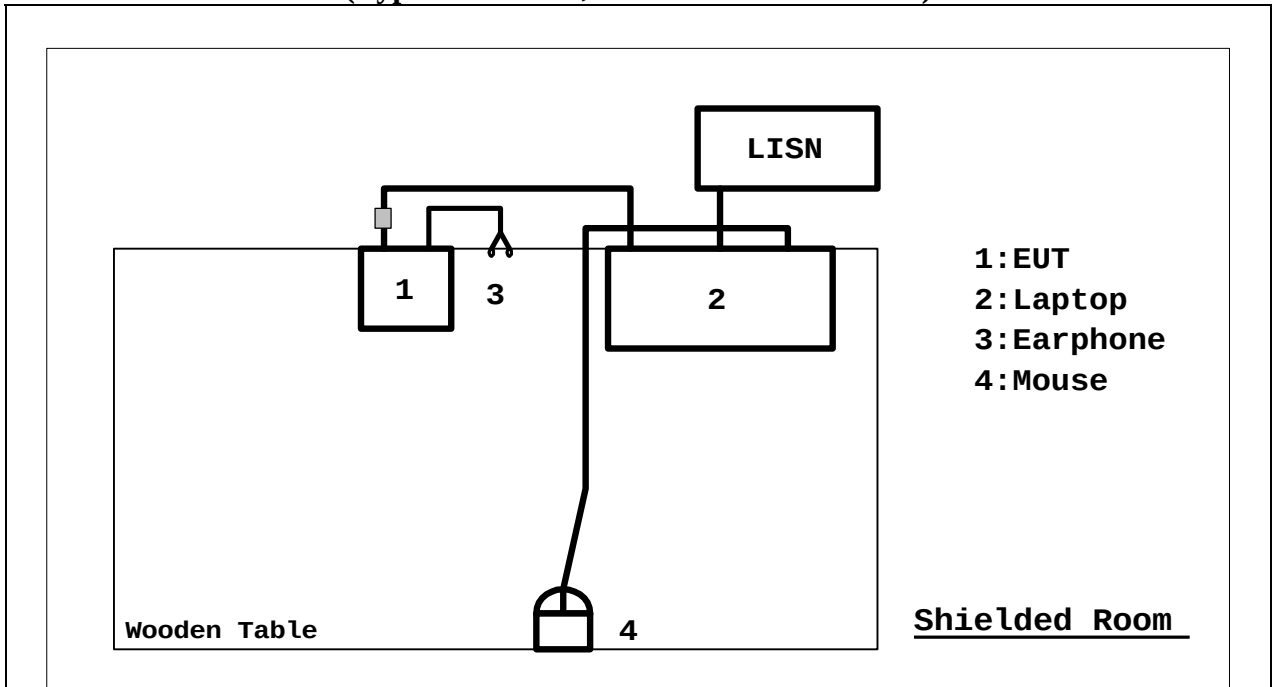
■ KEPT NOT KEPT

Min. limit margin

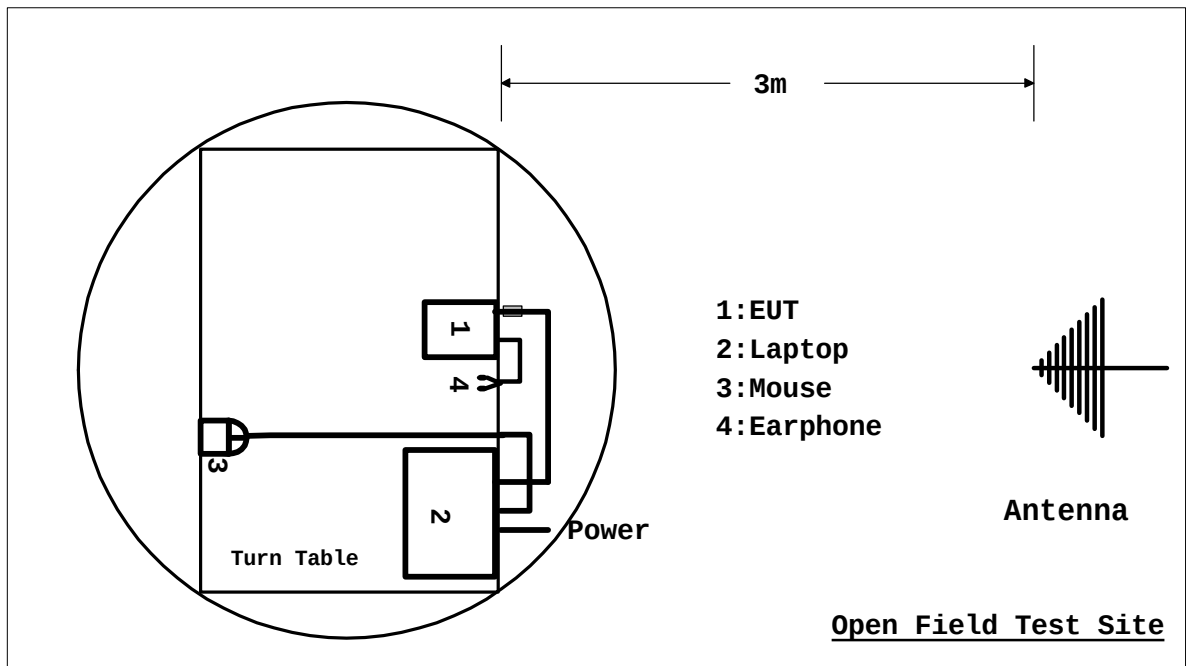
12.9 dB at 264.0 MHz

Remarks : See test-data at page 15~16.

**Test Set-Up**  
**(Type : DAH-300, Mode: Download Mode)**



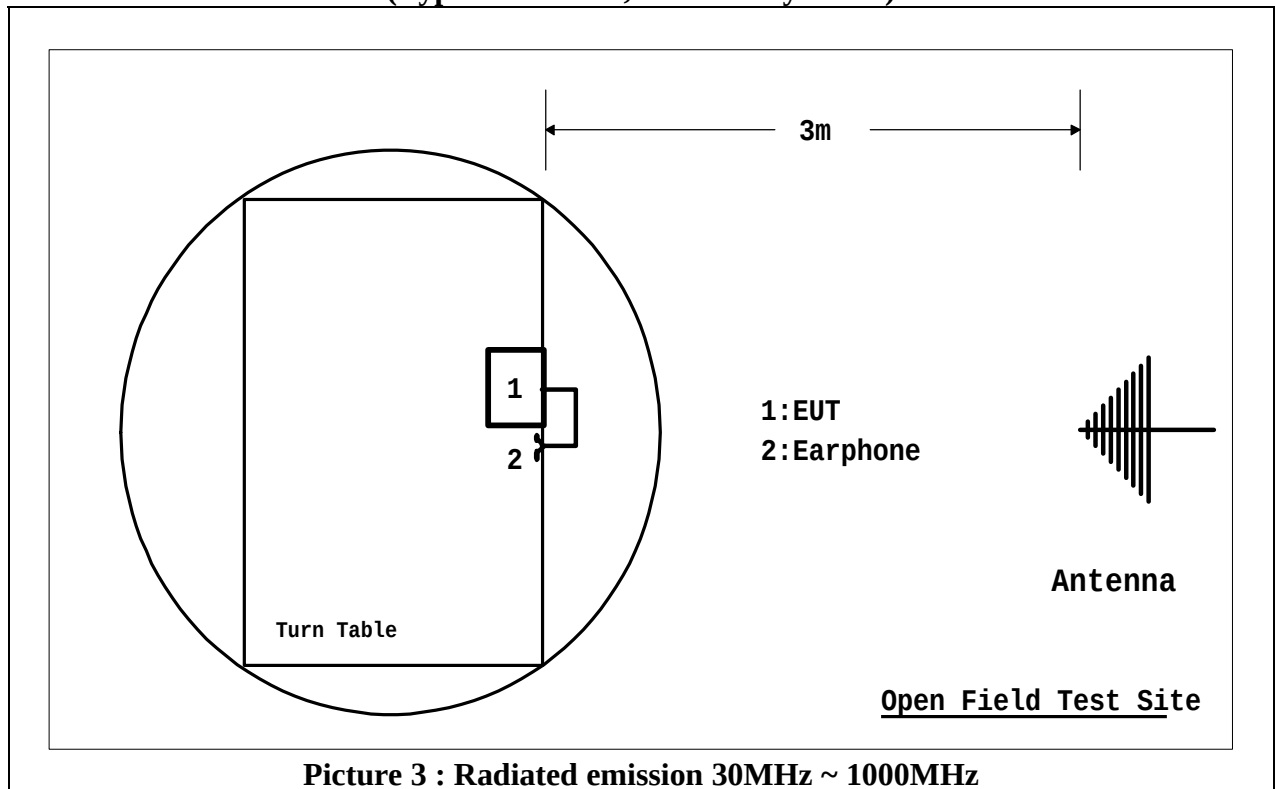
**Picture 1 : Conducted emission 450kHz ~ 30MHz**



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



**Test Set-Up**  
**(Type : DAH-300, Mode: Play Mode)**



## Conducted Emission Test Data

Type : DAH-300  
 Manufacturer : Hyun Won Inc.  
 Operation mode : Download files from PC to EUT  
 Date : July. 24, 2001

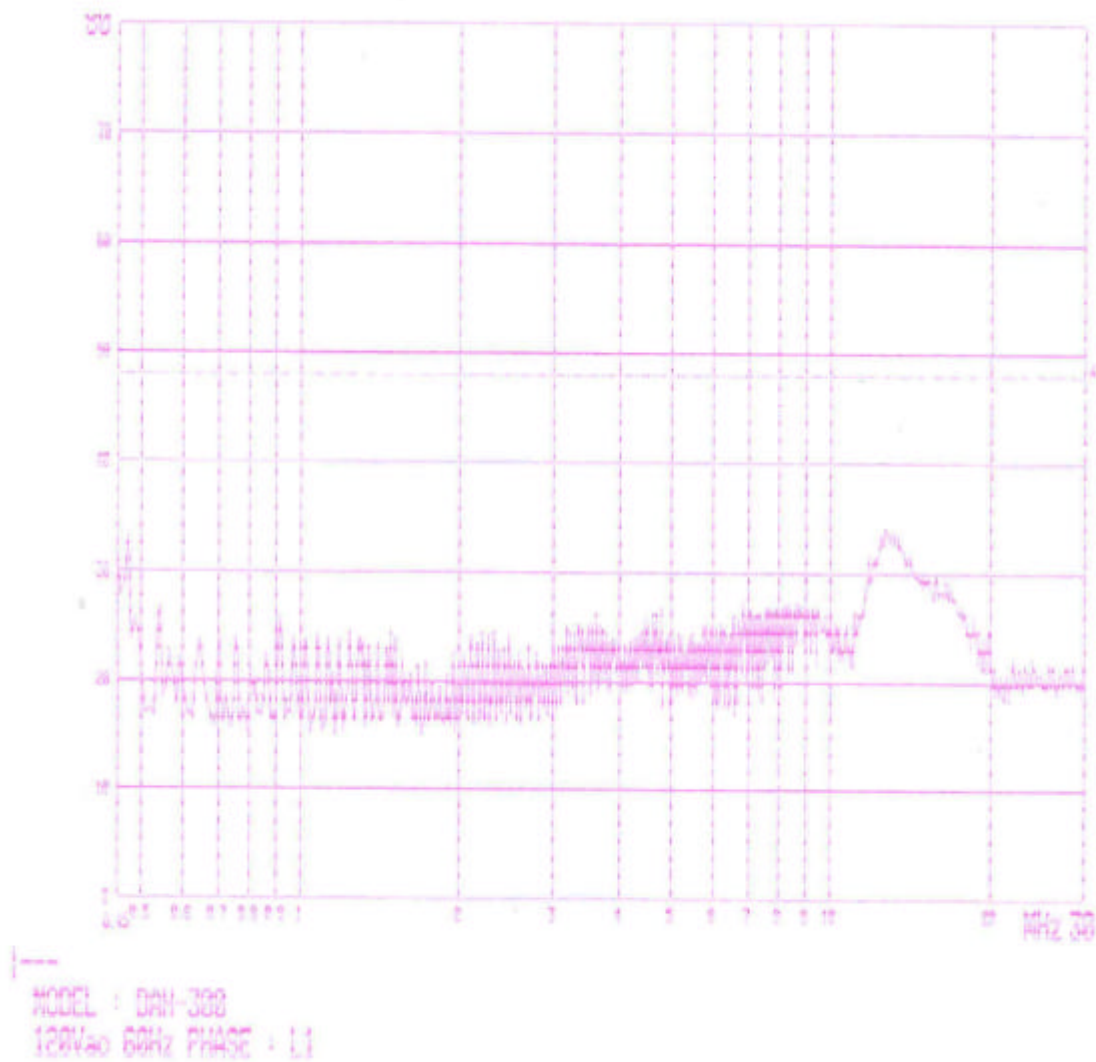
### Highest Emissions relative to the limit

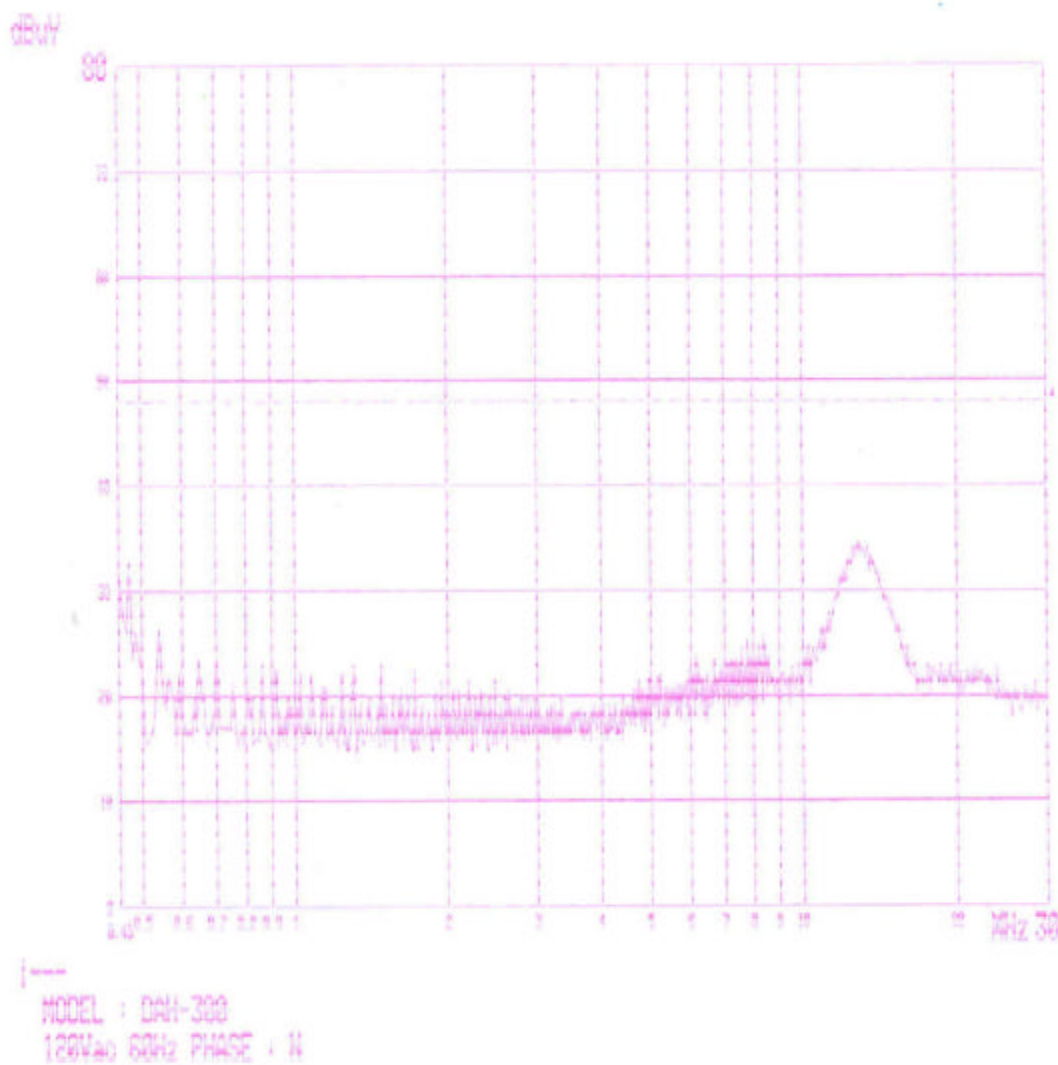
| Frequency<br>[MHz]              | Reading<br>[dBμV] | Insertion<br>loss<br>[dB] | Phase<br>(L1/N) | Result<br>[dBμV] | Limit<br>[dBμV] | Margin<br>[dB] |
|---------------------------------|-------------------|---------------------------|-----------------|------------------|-----------------|----------------|
| 0.4523                          | 30.7              | 0.8                       | L1              | 31.5             | 48.0            | 16.5           |
| 0.4728                          | 31.8              | 0.8                       |                 | 32.6             | 48.0            | 15.4           |
| 0.5411                          | 23.3              | 0.8                       |                 | 24.1             | 48.0            | 23.9           |
| 0.9162                          | 22.4              | 0.8                       |                 | 23.2             | 48.0            | 24.8           |
| 6.8490                          | 22.9              | 0.8                       |                 | 23.7             | 48.0            | 24.3           |
| 12.6733                         | 32.3              | 0.8                       |                 | 33.1             | 48.0            | 14.9           |
| 0.4521                          | 30.5              | 0.8                       | N               | 31.3             | 48.0            | 15.7           |
| 0.4726                          | 31.4              | 0.8                       |                 | 32.2             | 48.0            | 15.8           |
| 0.5410                          | 22.4              | 0.8                       |                 | 23.2             | 48.0            | 24.8           |
| 6.1488                          | 19.3              | 0.8                       |                 | 20.1             | 48.0            | 27.9           |
| 8.3593                          | 20.3              | 0.8                       |                 | 21.1             | 48.0            | 26.9           |
| 12.8354                         | 33.0              | 0.8                       |                 | 33.8             | 48.0            | 14.2           |
| Cable loss are less than 0.1 dB |                   |                           |                 |                  |                 |                |

\*L1 : Live Line

\*\*N : Neutral Line

\*\*\* Please refer to data graphs at page 11 ~ 12



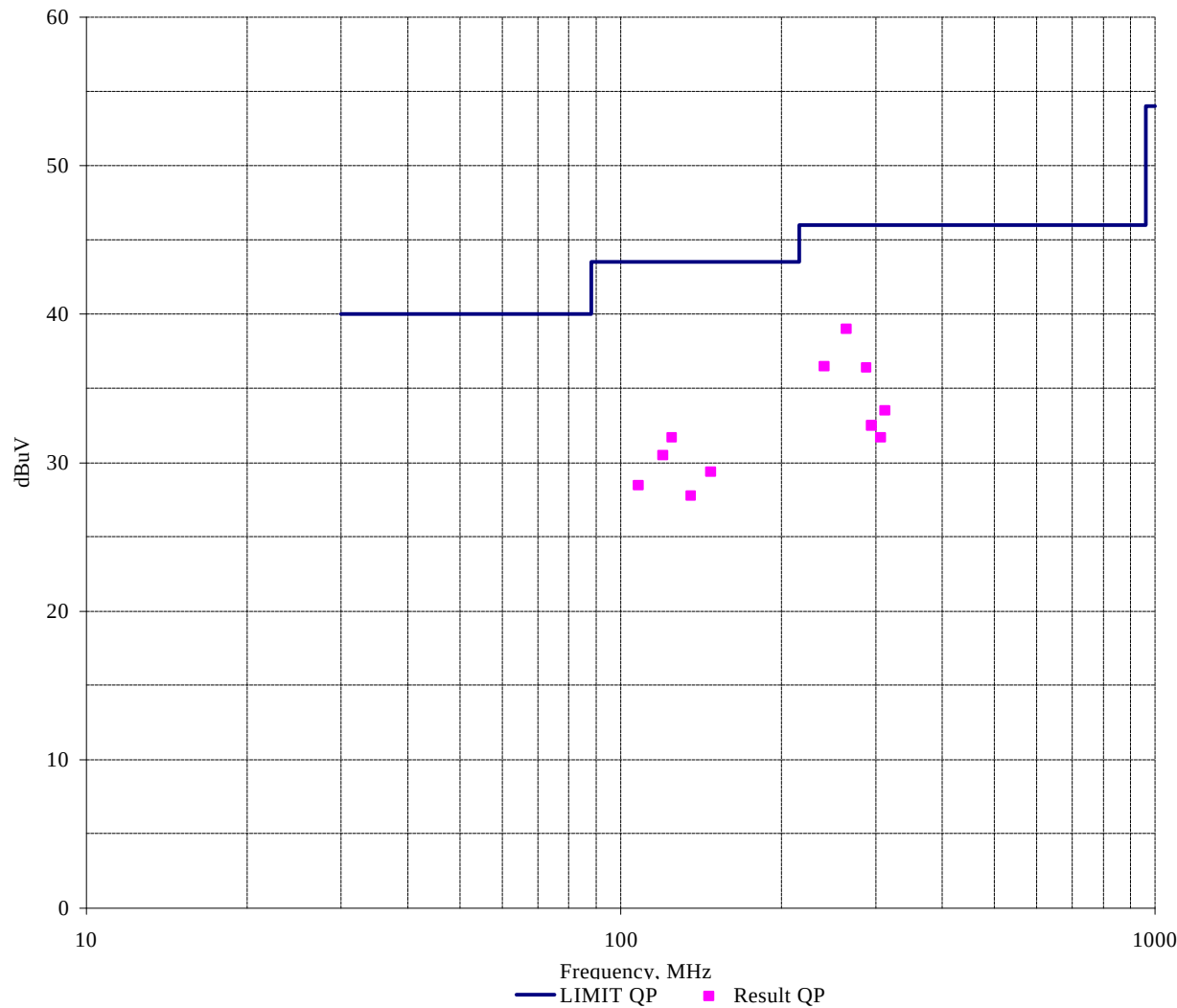


## Radiation Test Data

Type : DAH-300  
 Manufacturer : Hyun Won Inc.  
 Operation mode : Download files from PC to EUT  
 Test distance : 3 m  
 Antenna : VULB9160  
 Date : July. 25, 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] |
|----------------|-------------------|---------------------------|-----------------------|----------------|----------------|----------------|------------------|-----------------|----------------|
| 108.0          | 17.5              | 9.1                       | 1.9                   | 174            | 115            | V              | 28.5             | 43.5            | 15.0           |
| 120.0          | 18.7              | 9.8                       | 2.0                   | 177            | 125            | V              | 30.5             | 43.5            | 13.0           |
| 124.5          | 19.2              | 10.4                      | 2.1                   | 195            | 124            | V              | 31.7             | 43.5            | 11.8           |
| 135.2          | 14.7              | 11.0                      | 2.1                   | 173            | 121            | V              | 27.8             | 43.5            | 15.7           |
| 147.5          | 15.2              | 11.9                      | 2.3                   | 145            | 127            | V              | 29.4             | 43.5            | 14.1           |
| 240.0          | 23.5              | 10.1                      | 2.9                   | 180            | 289            | H              | 36.5             | 46.0            | 9.5            |
| 264.0          | 24.7              | 11.4                      | 2.9                   | 178            | 298            | H              | 39.0             | 46.0            | 7.0            |
| 288.0          | 21.5              | 11.8                      | 3.1                   | 150            | 254            | H              | 36.4             | 46.0            | 9.6            |
| 294.9          | 17.5              | 11.8                      | 3.2                   | 158            | 233            | H              | 32.5             | 46.0            | 13.5           |
| 306.6          | 16.7              | 11.7                      | 3.3                   | 178            | 287            | H              | 31.7             | 46.0            | 14.3           |
| 312.0          | 18.5              | 11.7                      | 3.3                   | 165            | 275            | H              | 33.5             | 46.0            | 12.5           |

MEASUREMENT OF DISTURBANCE RADIATION

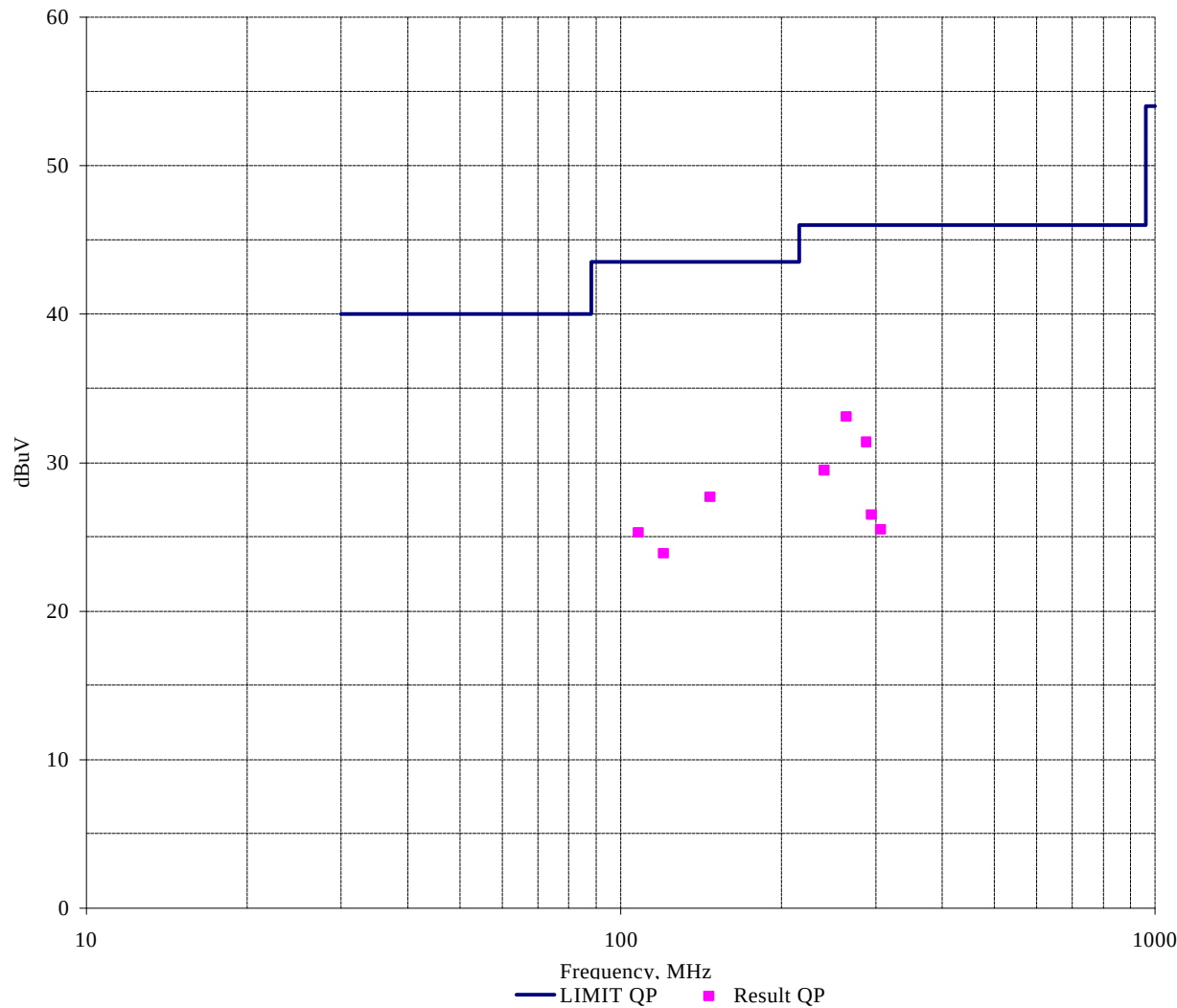


## Radiation Test Data

Type : DAH-300  
 Manufacturer : Hyun Won Inc.  
 Operation mode : Play Mode  
 Test distance : 3 m  
 Antenna : VULB9160  
 Date : July. 25, 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] |
|----------------|-------------------|---------------------------|-----------------------|----------------|----------------|----------------|------------------|-----------------|----------------|
| 108.0          | 14.3              | 9.1                       | 1.9                   | 174            | 100            | V              | 25.3             | 43.5            | 18.2           |
| 120.2          | 12.0              | 9.9                       | 2.0                   | 177            | 100            | V              | 23.9             | 43.5            | 19.6           |
| 147.0          | 13.5              | 11.9                      | 2.3                   | 195            | 100            | V              | 27.7             | 43.5            | 15.8           |
| 240.0          | 16.5              | 10.1                      | 2.9                   | 173            | 102            | H              | 29.5             | 46.0            | 16.5           |
| 264.0          | 18.8              | 11.4                      | 2.9                   | 145            | 104            | H              | 33.1             | 46.0            | 12.9           |
| 288.0          | 16.5              | 11.8                      | 3.1                   | 150            | 244            | H              | 31.4             | 46.0            | 14.6           |
| 294.5          | 11.5              | 11.8                      | 3.2                   | 158            | 230            | H              | 26.5             | 46.0            | 19.5           |
| 306.6          | 10.5              | 11.7                      | 3.3                   | 178            | 238            | H              | 25.5             | 46.0            | 20.5           |

MEASUREMENT OF DISTURBANCE RADIATION





## 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 : July. 24, 2001

End of testing : July. 25, 2001

**Reviewed by :**

**Approved by :**

Joan H Lee

Qin Meng

Joon H. Lee. EMC Manager  
IST EMC Lab.

G. Chung Chief of EMC Lab.