

IST EMC LAB.

EMISSION TEST REPORT

Test report file No. : **00-IST-082/FB** Date of issue : Nov. 17, 2000.

Model / Type No. : AR-200

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 21 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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B) Test Data.

Conducted emissions (Mains)	: 450 kHz - 30 MHz	<u>14 ~ 19</u>
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C) Appendix

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Block & Schematic Diagram
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EUT's Pictures
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TEST REGULATIONS

The tests were performed according to the following regulations ;

- . EN 50081-1 / 2. 1991.
- . EN 55011 / 3. 1991. . Croup 1. . Croup 2.
- . Class A. . Class B.
- . EN 55014 / 4. 1993. . Household appliances and similar
- . Portable tools
- . Semiconductor devices
- . - EN 55014 / A2:1990
- . - EN 55015 / A1:1990 . - EN 55015 / 2.1987 . - EN 55015 / 12.1993
- . - EN 55022 / 8.1994 . - Class A . - Class B

-
- . - BS
 - . - VCCI
 - . - FCC Part 15, Subpart B (Unintentional Devices, Class B)
 - . - CISPR

All testing were conducted at IST EMC Laboratory.

ENVIRONMENTAL CONDITIONS

Temperature	<u>24</u>
Humidity	<u>45</u> %
Atmospheric pressure	<u>999</u> mbar

TEST CONDITIONS

The **measurement of the conducted emissions (Interference voltage)** was performed in a shielded room.

Test location :

1 - Shielded room. No.1

2 - Compact chamber 2

Used testing instruments :

Type	Manufacturer	Calibration. Date	Inventory No.
1 ESH 3	Rohde & Schwarz	Oct. 8. 2000	No. : 90-IRV-07

Test - accessories :

Type	Manufacturer	Calibration. Date	Inventory No.
1 - 3725/2	EMCO	Dec. 18. 1999	No. : 90-ILN-08
1 - 3825/2	EMCO	Oct. 8. 2000	No. : 90-ILN-09

Measurement Procedures :

Conducted emissions measurements were made in accordance with ANSI C-63.4-1992, "FCC procedure for measuring RF Emissions from Computing Devices".

The measurements 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.

IST EMC LAB.

The **measurement of the radiated emissions (Electric field)** in the frequency range of from 30 MHz to 1GHz was performed in horizontal and vertical antenna polarization at a non-reflecting open-site and a test distance of :

- | | |
|-----------------|---------------------|
| ┆ - Open-site 1 | ┆ - Compact chamber |
| ┆ - 3 meters. | ┆ - 10 meters |

Used testing instruments :

Type	Manugacturer	Calibration. Date	Inventory No.
┆ - ESVP	Rohde & Schwarz	July. 21. 2000	No. : 90-IAP-09

Test - accessories :

Type	Manugacturer	Calibration. Date	Inventory No.
┆ VULB 9160	Schwarzbeck	July. 11. 2000	No. : 98-IAN-01

Measurement procedures

Radiated measurements were in accordance with ANSI C63.4-1992 "FCC Procedure for measuring RF Emissions from Computing Devices." 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. K, Bae. / Research Engineer
IST EMC Lab.

EQUIPMENT UNDER TEST

Equipment Description

The Equipment Under Test (EUT) is the **Hyun Won Inc. (Model: AR-200) MP3 Player**

Flash Memory 32MB (Option: 64MB)

Power (Battery): One Ni-MH 1.2V Rechargeable

Output Power (Earphones): 5mW

Signal Noise Ratio: 90dB

Output Frequency Range: 20 Hz – 20 kHz

Playing Time: 5 Hours

Weight: 55g

Size: 63 X 102 X 11.5 (mm)

Operation - mode of the E.U.T. :

The equipment under test was operated during the measurement under following conditions :

- . Standby.
- . Test program (H – Pattern) :
- . Test program (customer specific)
- ‡ Practice operation: Download files from PC to AR-200,
Battery charging by battery charger and playing at the same time

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	Brio BA600/550	HP	SG0163782	N/A
PS/2 Mouse	M-S48a	HP	LZE01000039	JNE201213
Keyboard	SK-2502C	HP	M000456678	N/A
Monitor	B700	Daewoo	N/A	C5F7NFCMC712B

Cable Type

‡ Unshielded cables :

- Power cable (One phase three wires, H-N-G), Length – 1.8m, 1.5m
- USB I/O cable (with core) : 1.5 m
- Earphones cable : 1.2 m
- Power supply cord (for battery charging at conducted disturbance test) : 0.2m

‡ Shielded cables :

- Monitor's signal cable : 1.5 m
- Keyboard (6Pin DIN, PS/2), Length – 1.2m
- Mouse Cable (6Pin DIN, PS/2), Length – 1.5m

TEST RESULT**Conducted emissions : 450 kHz - 30 MHz**

The requirements are.

☒ KEPT ☐ NOT KEPT

Min. limit margin

-3.2 dB at 30.0 MHz

Remarks : See test-graph to be attached at pages 12~14.

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 - 2000 MHz

The requirements are

☒ KEPT ☐ NOT KEPT

Min. limit margin

-5.5 dB at 203.2 MHz

Remarks : See test-data at page 15.

Test Sep-Up
(Type : AR-200, Mode: download files)



Figure 1(a) : Conducted emission 450kHz ~ 30MHz

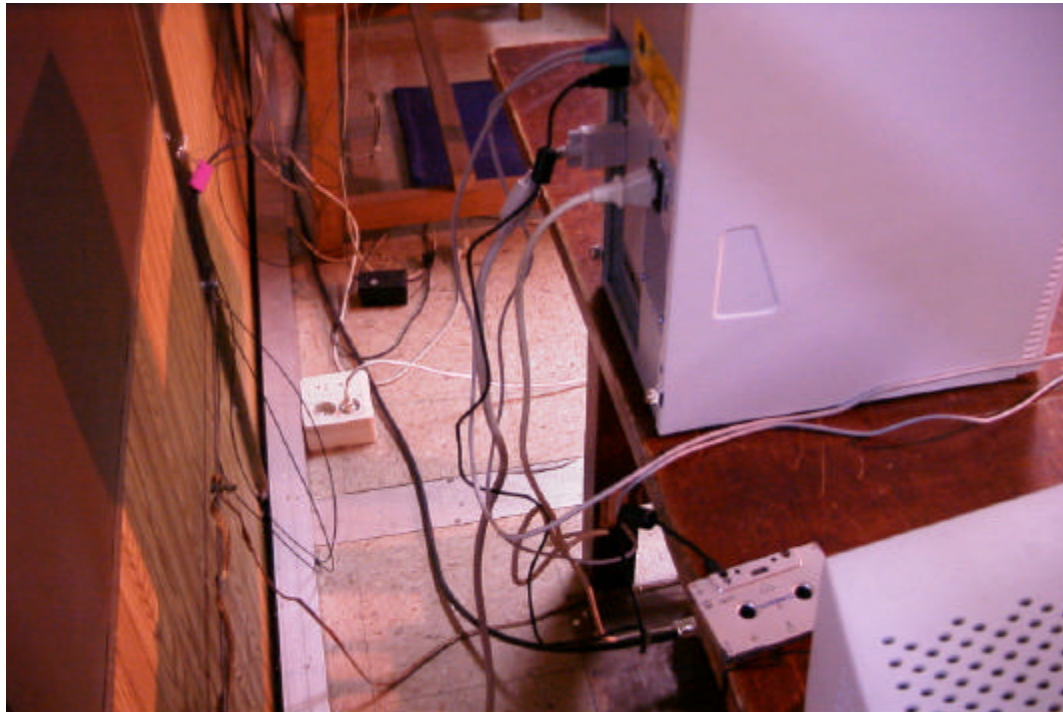


Figure 1(b) : Conducted emission 450kHz ~ 30MHz

Test Sep-Up
(Type : AR-200, Mode: download files)



Figure 2(a) : Radiated Emission 30MHz ~ 1000MHz

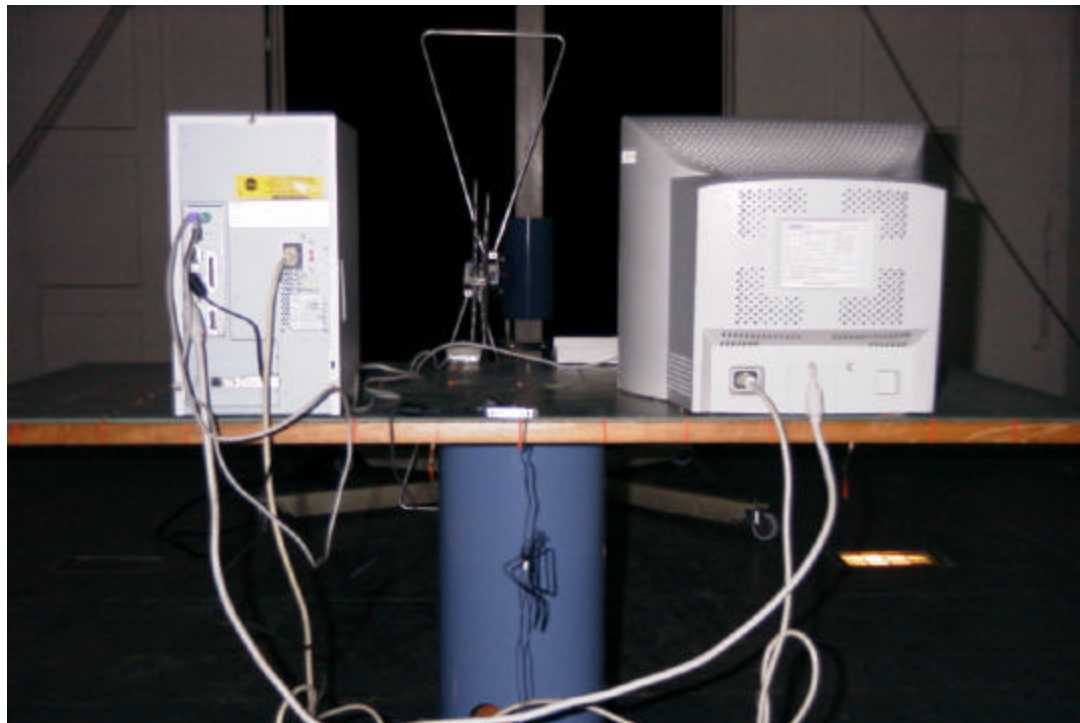


Figure 2(b) : Radiated Emission 30MHz ~ 1000MHz

Test Sep-Up
(Type : AR-200, Mode: charging battery)



Figure 3(a) : Conducted emission 450kHz ~ 30MHz

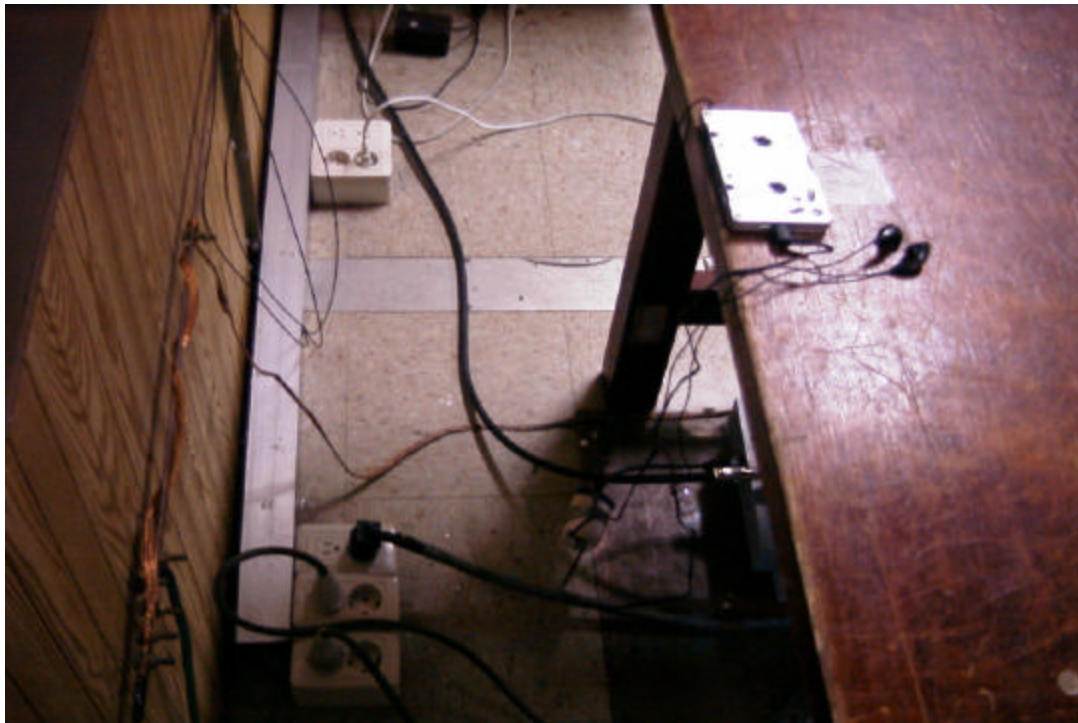


Figure 3(b) : Conducted emission 450kHz ~ 30MHz

Test Sep-Up
(Type : AR-200, Mode: charging battery)

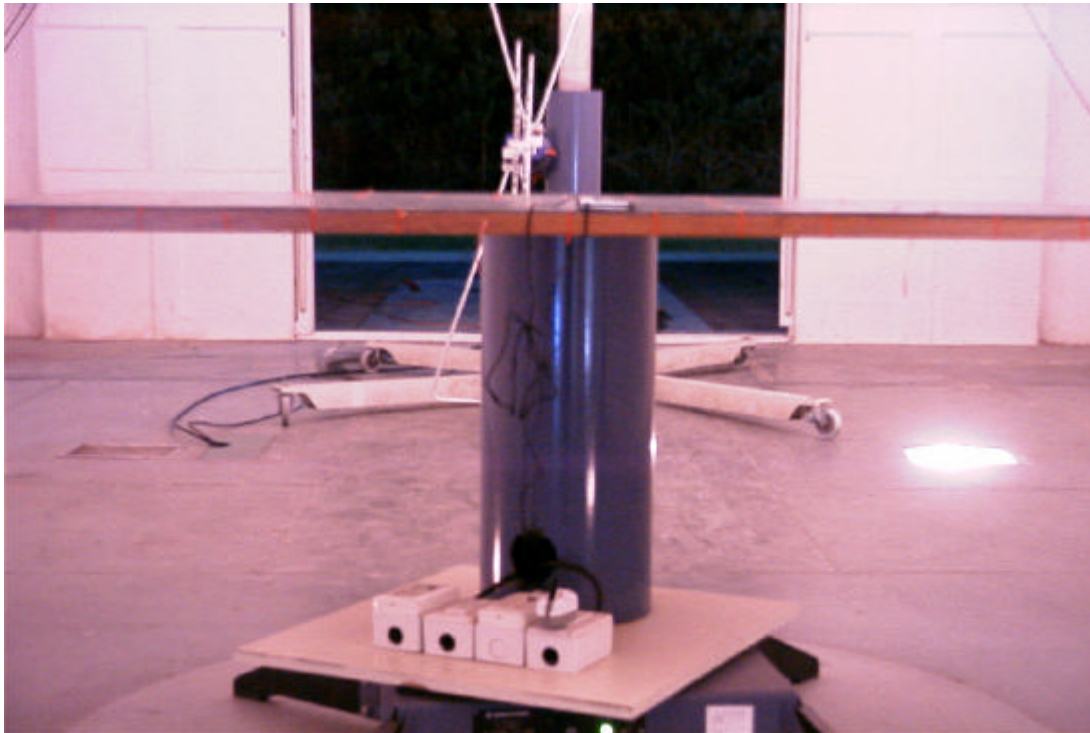
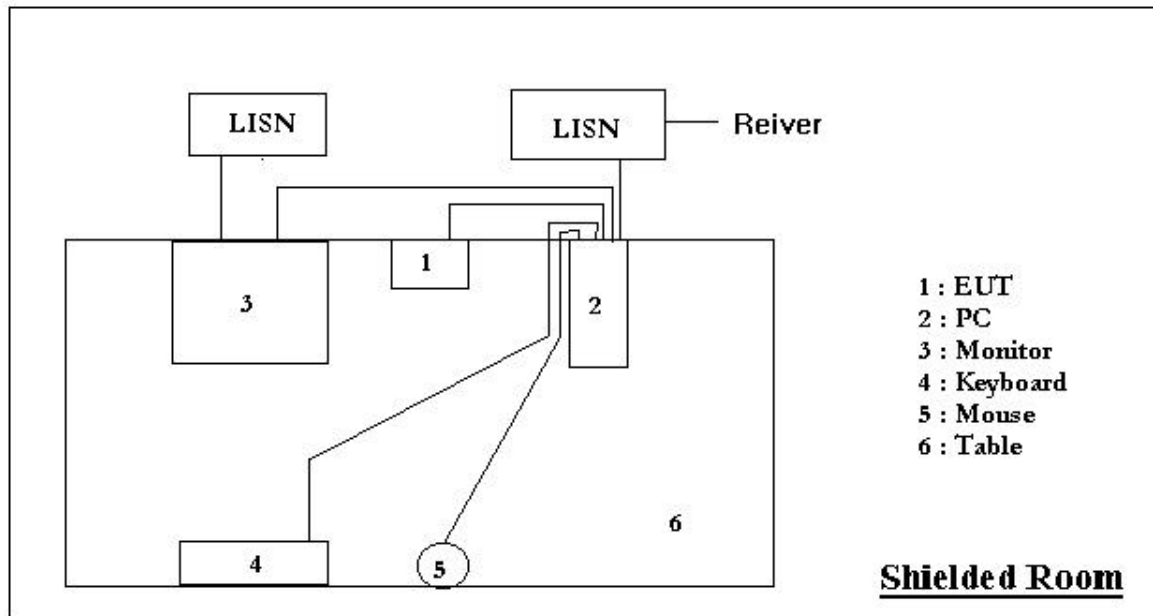


Figure 4(a) : Radiated Emission 30MHz ~ 1000MHz

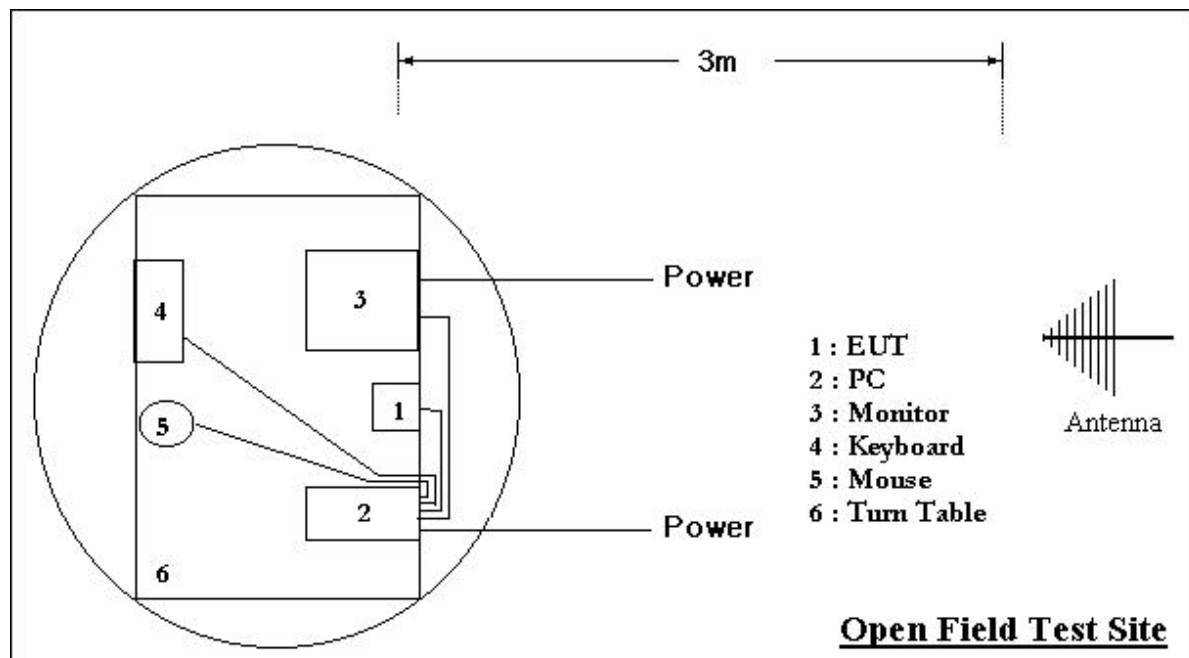


Figure 4(b) : Radiated Emission 30MHz ~ 1000MHz

Test Set-Up
(Type : AR-200, Mode: download files)

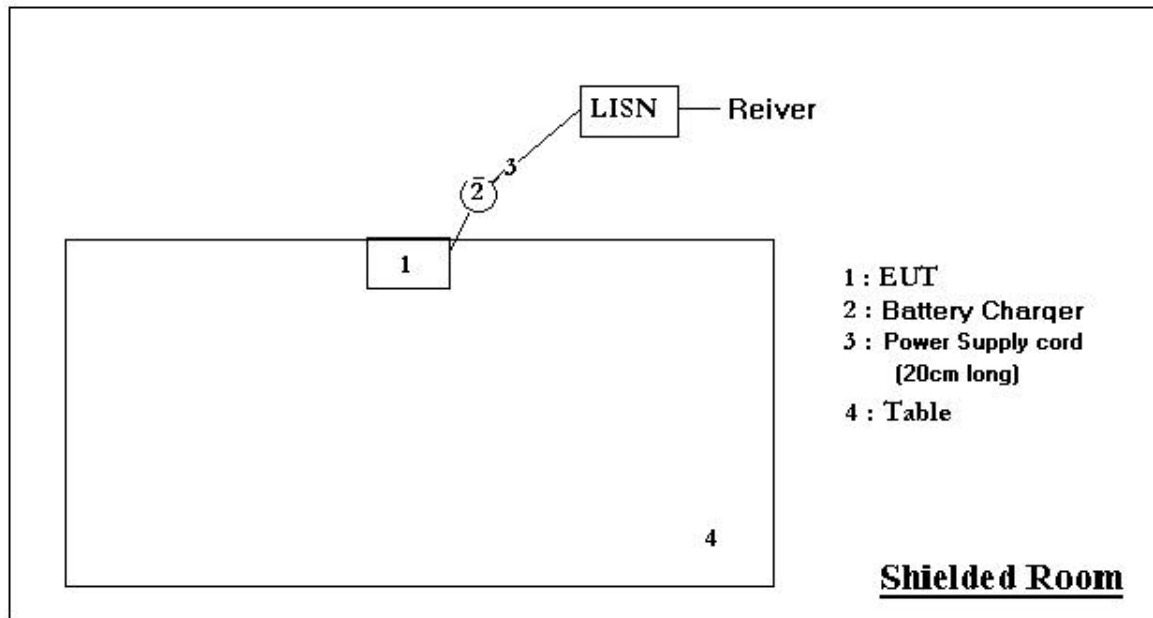


Picture 1 : Conducted emission 450kHz ~ 30MHz

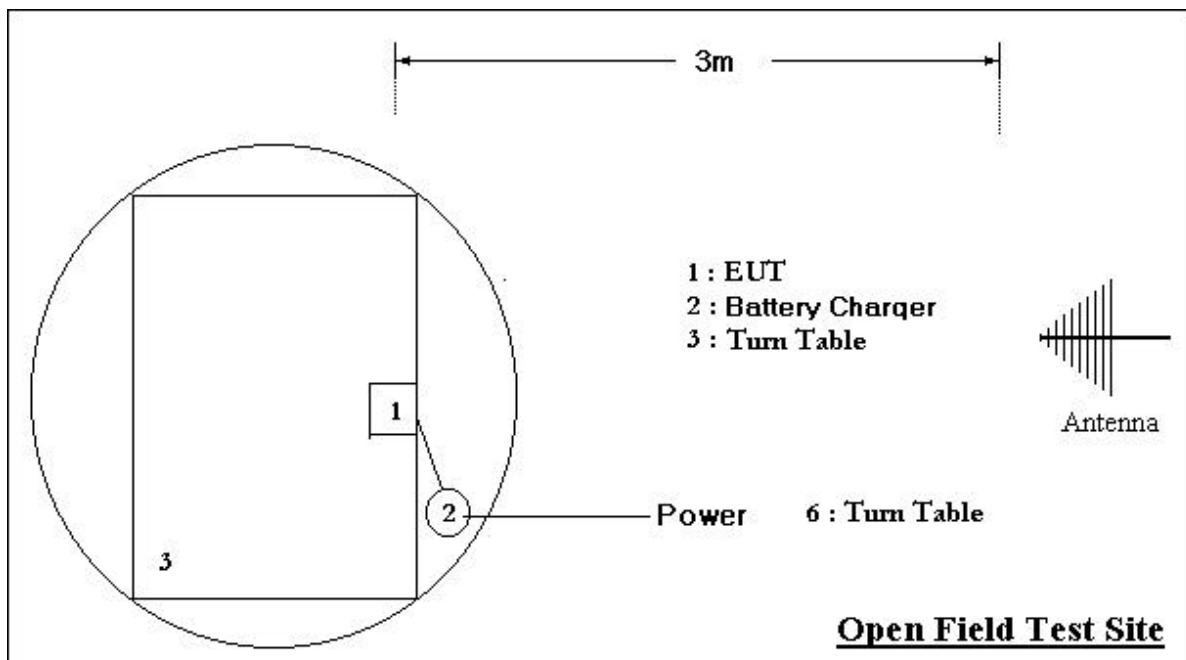


Picture 2 : Radiated emission 30MHz ~ 1000MHz

Test Set-Up
(Type : AR-200, Mode: charging battery)



Picture 1 : Conducted emission 450kHz ~ 30MHz



Picture 2 : Radiated emission 30MHz ~ 1000MHz

Conducted Emission Test Data

Type : AR-200
 Manufacturer : Hyun Won Inc.
 Operation mode : Download files from PC to AR200
 Date : Nov. 15. 2000

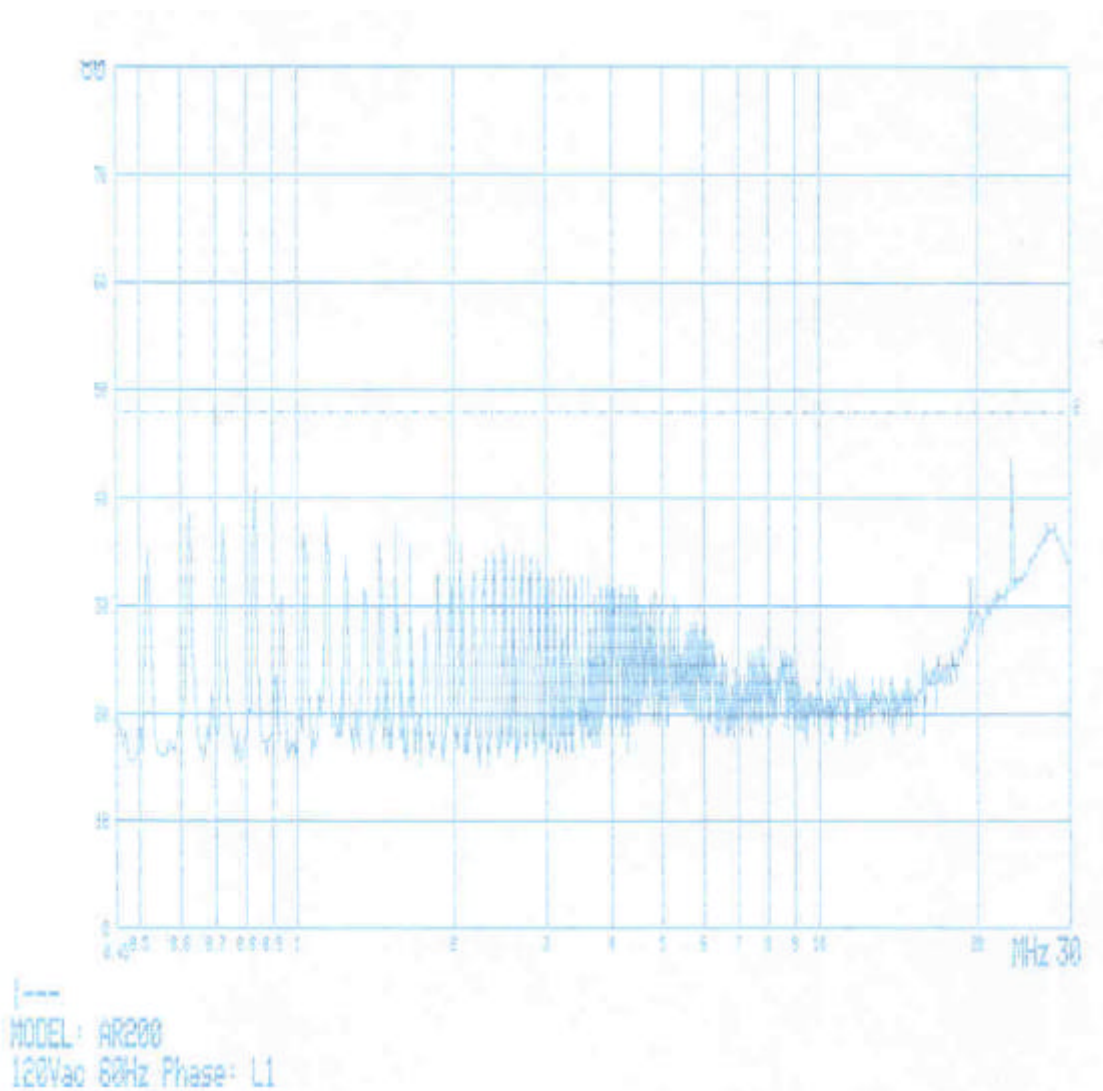
Frequency [MHz]	Reading [dBμV]	Phase (*L1/**N)	Limit [dBμV]	Margin [dB]
0.62	38.6	L1	48.0	-9.4
0.83	40.8	L1	48.0	-7.2
23.21	43.8	L1	48.0	-4.2
0.62	36.2	N	48.0	-11.8
0.83	40.6	N	48.0	-7.4
27.71	37.4	N	48.0	-10.6

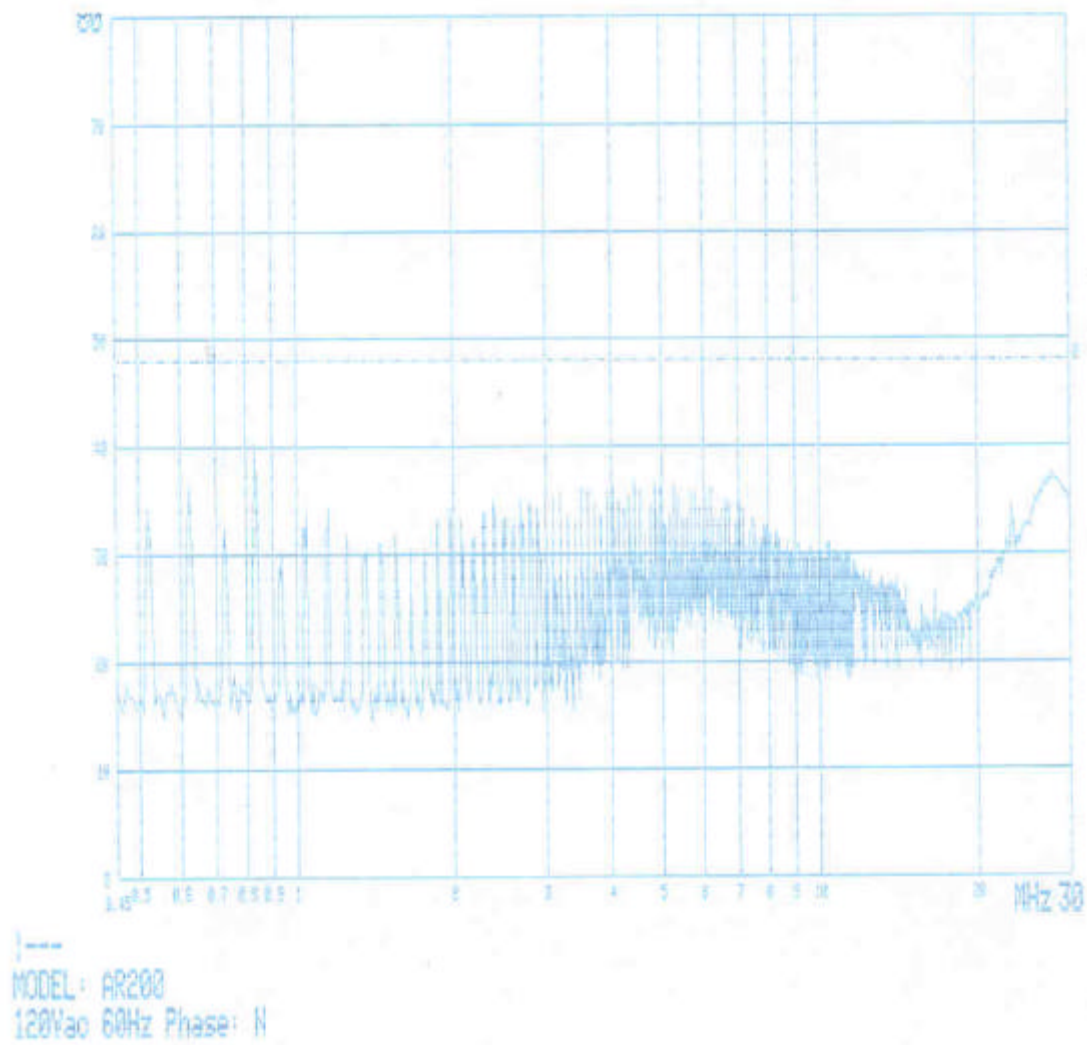
*L1 : Live Line

**N : Neutral Line

*** “—“ is means that the EuT has a margin

**** Please refer to data graphs at page 15 ~ 16





Conducted Emission Test Data

Type : AR-200
 Manufacturer : Hyun Won Inc.
 Operation mode : Battery charging by battery charger and playing at the same time
 Date : Nov. 15. 2000

Frequency [MHz]	Reading [dBμV]	Phase (*L1/**N)	Limit [dBμV]	Margin [dB]
0.95	42.6	L1	48.0	-5.4
0.99	43.1	L1	48.0	-4.9
1.21	43.9	L1	48.0	-4.1
0.53	39.7	N	48.0	-8.3
0.79	38.0	N	48.0	-10.0
1.06	37.2	N	48.0	-10.8

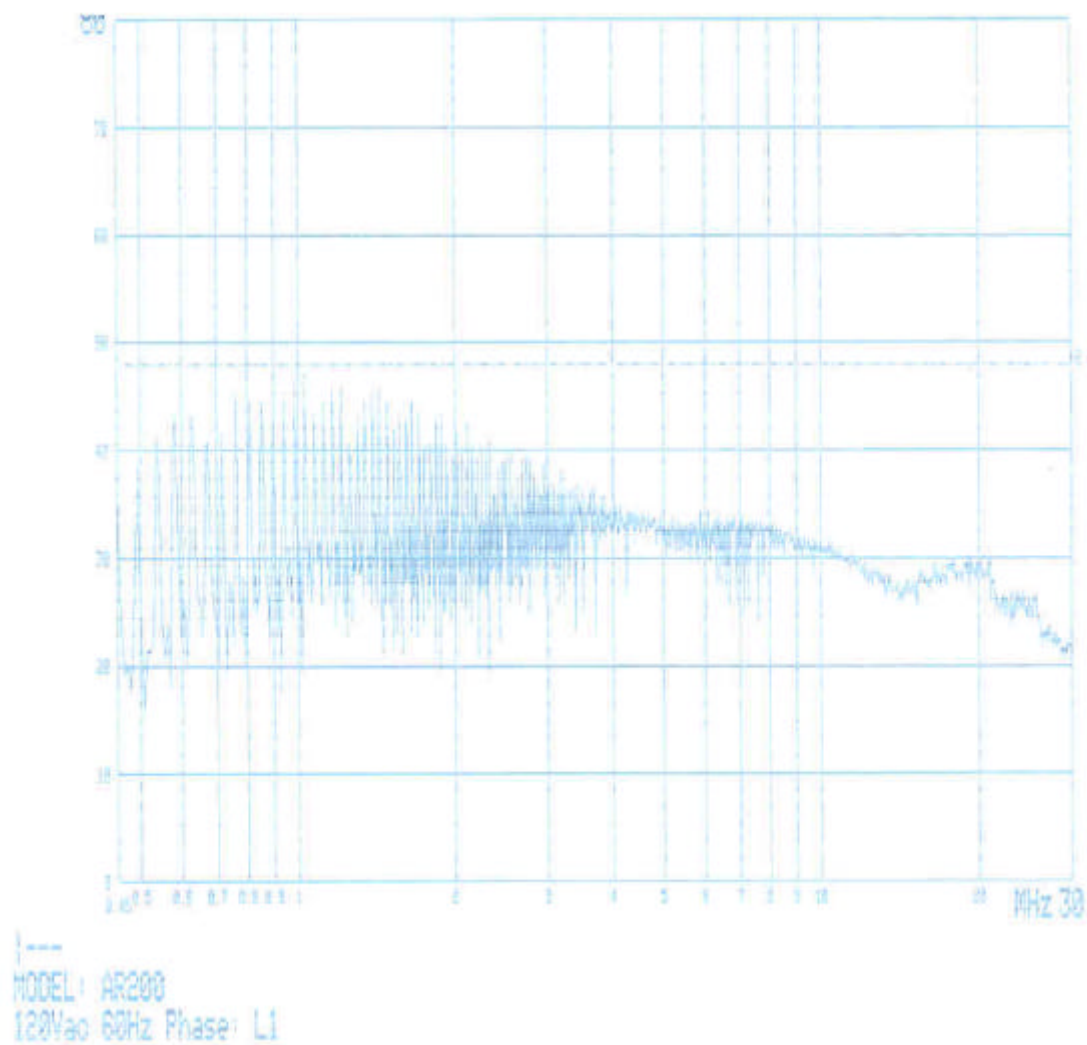
*L1 : Live Line

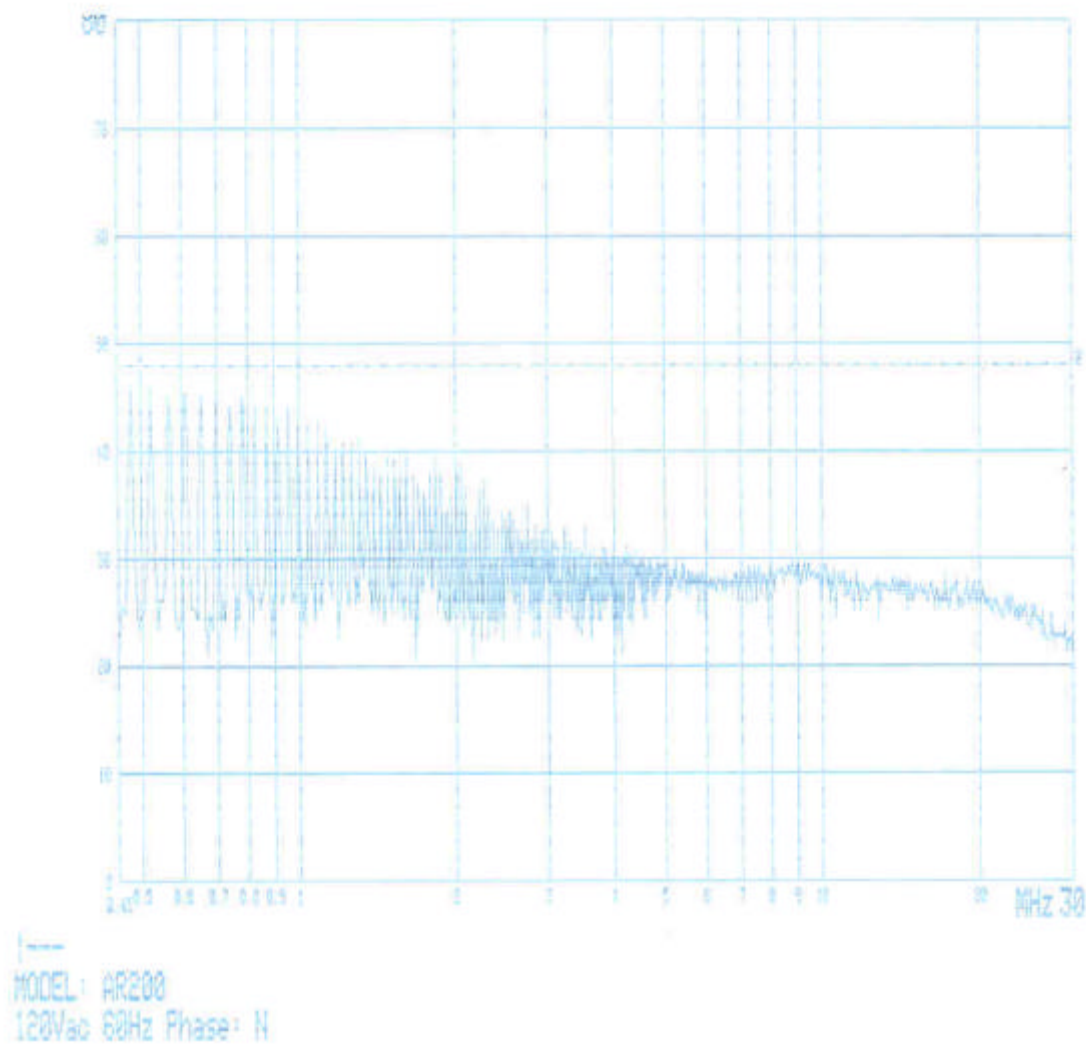
**N : Neutral Line

*** “—“ is means that the EuT has a margin

**** Power supply code used for test, it's length are 0.2m

***** Please refer to data graphs at page 18~19





Radiation Test Data

Type : AR-200
 Manufacturer : Hyun Won Inc.
 Operation mode : Download file from PC to AR-200 & Play mode
 Test distance : 3 m
 Antenna : VULB9160
 Date : Nov. 16, 2000.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [m]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
80.4	11.0	7.7	1.6	25	1.0	V	20.3	40	-19.7
120.0	14.2	9.9	2.0	29	1.1	V	26.1	43.5	-17.4
144.0	12.0	11.8	2.2	220	1.0	V	26.0	43.5	-17.5
168.0	13.0	12.	2.4	345	1.4	V	27.7	43.5	-15.8
180.7	18.0	10.5	2.4	340	1.8	H	30.9	43.5	-12.6
203.2	27.0	8.5	2.5	15	2.4	H	38.0	43.5	-5.5
267.1	7.0	11.5	3.0	18	1.6	V	21.4	46	-24.6

* Radiated measurement on charging mode have a more margin than download mode.

** Radiation test data of charging mode is omitted.

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 CRF 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 : Oct. 30, 2000

End of testing : Nov. 16, 2000

Reviewed by :

Approved by :

Joon H, Lee. EMC Manager
Daewoo EMC Lab.

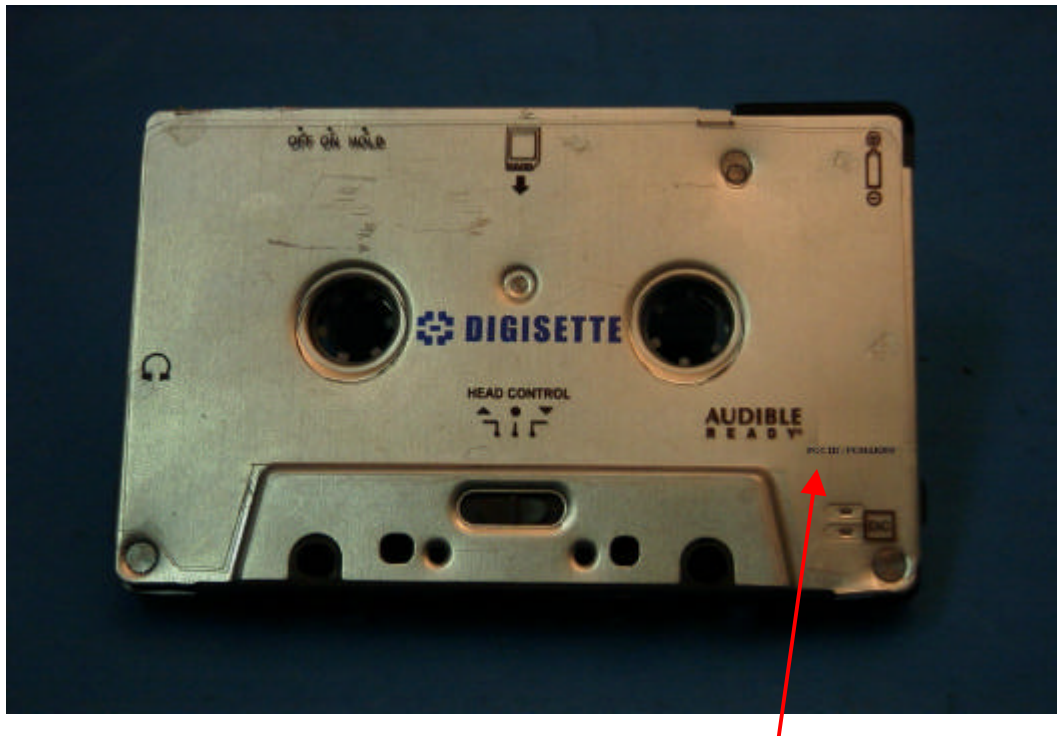
G, Chung. Chief of EMC Lab.

Specification plate

Label is not attached on the product because the product is too small to attach the proper label.

Even if label is not attached, FCC ID is printed on the surface of product and FCC sentence is printed in the User's Manual.

Photograph of labelling



FCC ID : PCMAR200

Block & Schematic Diagram

User's Manual

EUT's Pictures

Component List