



EMISSION TEST REPORT

Test report file No. : **01-IST-081/FB** Date of issue : July. 02, 2001.

Model / Type No. : Otis

Brand name : Otis

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 15 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>10~12</u>
Radiated emissions	: 30 MHz – 1 GHz	<u>13~14</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 2.4V [AAA size 1.5V x 2. Alkaline battery]
- Brand name : Otis
- Manufactured by : Hyun Won Inc.
- Contact person : Taek Kyun, Shin / General Manager

ENVIRONMENTAL CONDITIONS

Temperature	<u>27</u>
Humidity	<u>46</u> %
Atmospheric pressure	<u>1000</u> mbar

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	Oct. 08, 2000	861742/018
■ 3725/2	LISN	EMCO	Oct. 08, 2000	9102-1788
■ 3825/2	LISN	EMCO	Dec. 20, 2000	9103-1788
■ ESH 3-Z2	Pulse Limiter	Rohde & Schwarz	Jun. 16, 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
- - 3 meters
- - Compact chamber
- - 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	July. 21, 2000	861744/004
■ VULB 9160	Antenna	Schwarzbeck	July. 11, 2000	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.**

Flash Memory	64MB On-board(expandable to 128MB though) MultiMediaCard(MMC) Slot
Size	75X 56 X 19 (mm)
Battery	DC 2.4V [AAA size 1.5V x 2, alkaline battery]
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.
- Operational Condition : - Download files from Laptop to EUT
- Play Mode

Configuration of the equipment under test :

Following peripheral device(s) and interface cables were connected during the measurement :

Equipment	Type	Brand	Serial No	FCC ID
Laptop	ARMADA E500	COMPAQ	AE5 P3600T4X12DC6458	DoC

- USB I/O cable(with core) : 1.35m
- Earphone cable(with core) : 1.25 m

TEST RESULT

Download Mode :

Conducted emissions : 450 kHz - 30 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

_____ 12.0 _____ dB at _____ 12.781 _____ MHz

Remarks : See test data and graphs to be attached at pages 10~12.

The plots represent of peak measurement.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are

☒ KEPT

☐ NOT KEPT

Min. limit margin

_____ 3.7 _____ dB at _____ 396.0 _____ MHz

Remarks : See test-data at page 13.

Play Mode :

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are

☒ KEPT

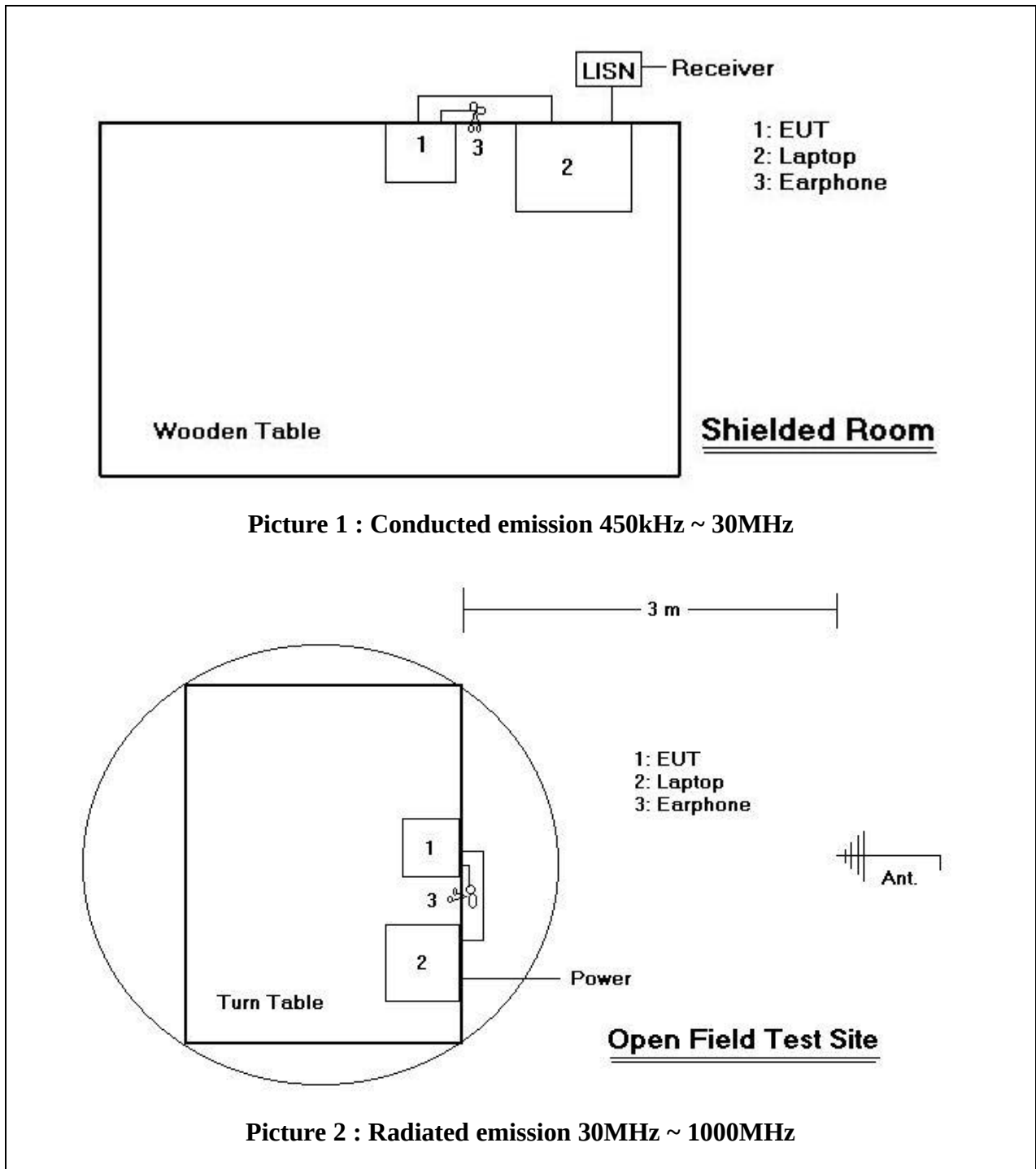
☐ NOT KEPT

Min. limit margin

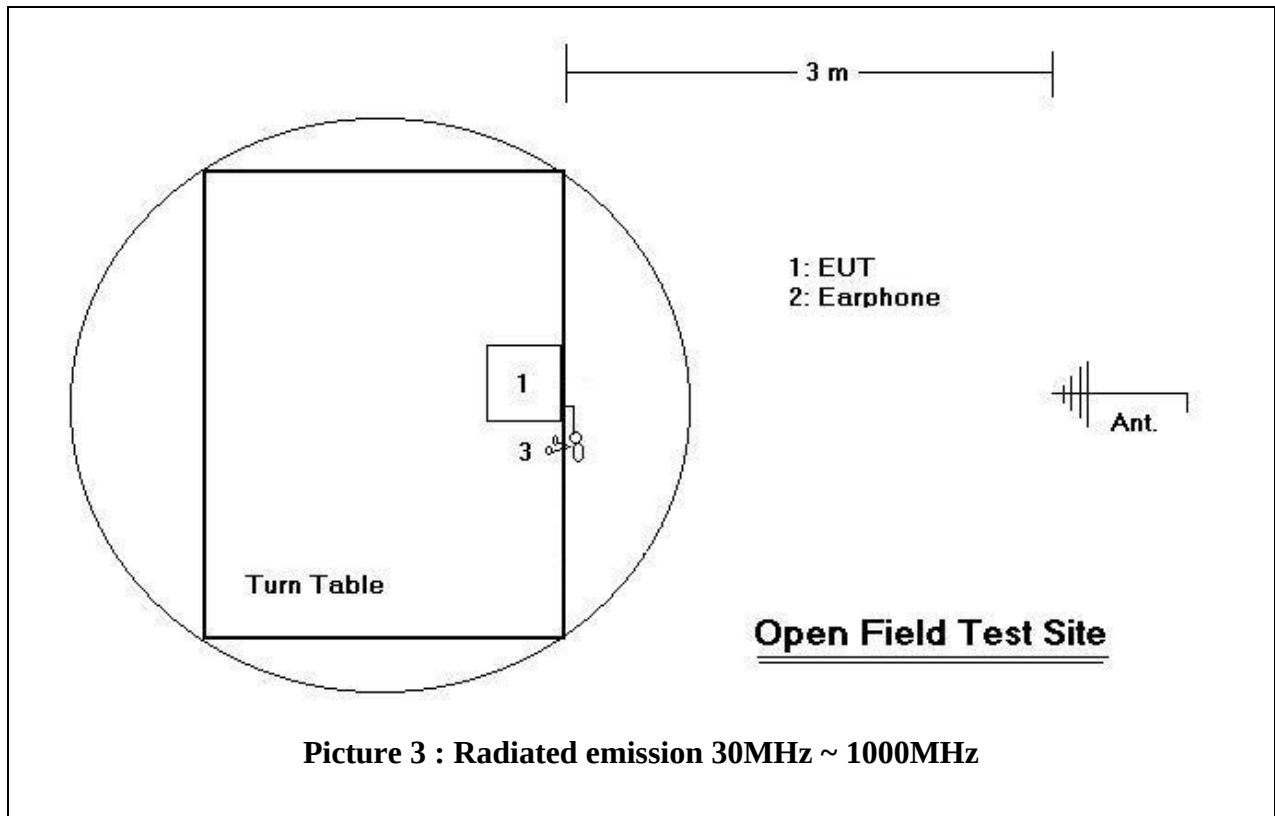
_____ 3.6 _____ dB at _____ 304.8 _____ MHz

Remarks : See test-data at page 14.

Test Set-Up
(Type : Otis, Download Mode)



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



Conducted Emission Test Data

Type : Otis
 Manufacturer : Hyun Won Inc.
 Operation mode : Download files from Laptop to OTIS
 Date : June. 26, 2001

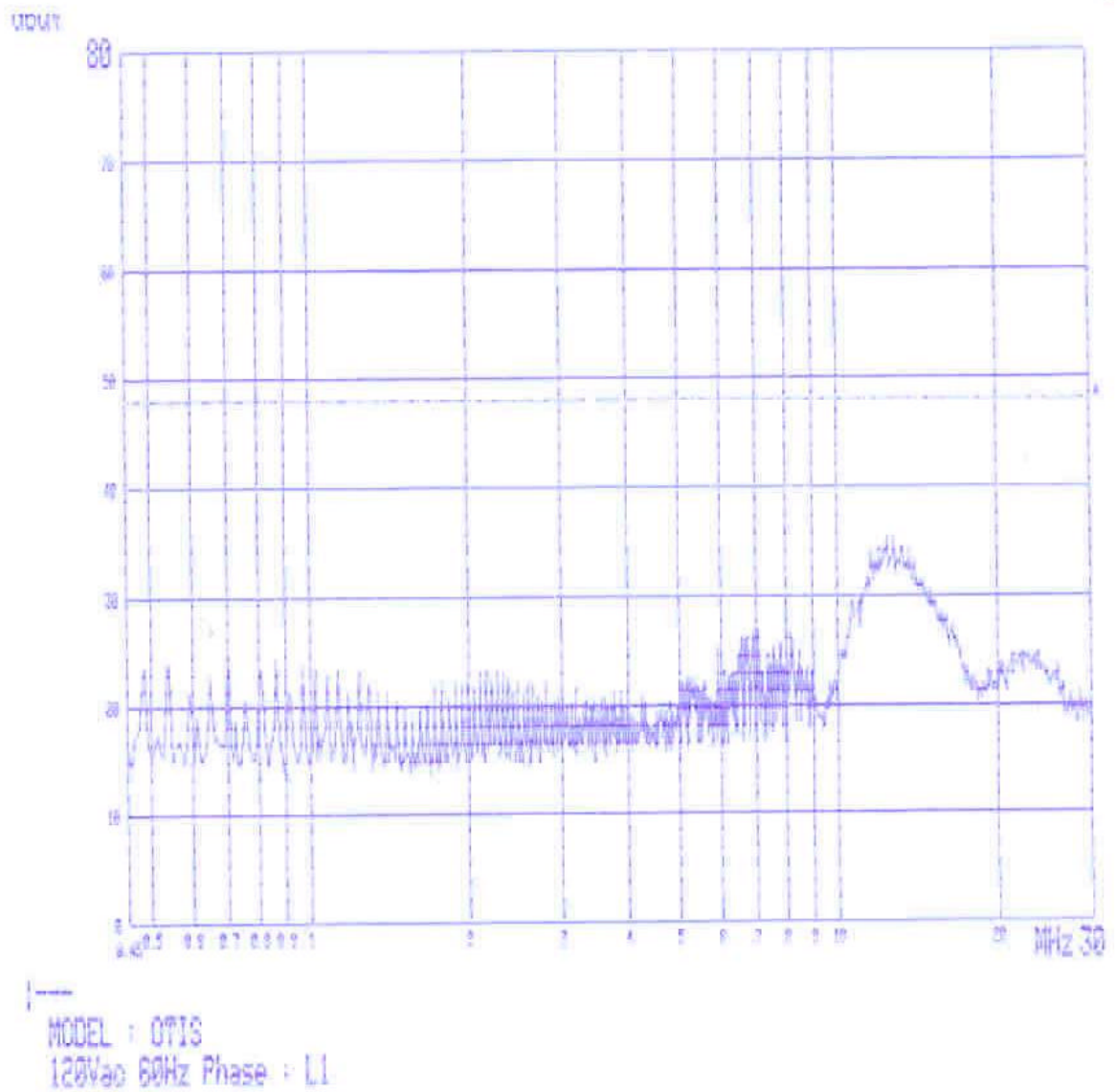
Highest Emissions relative to the limit

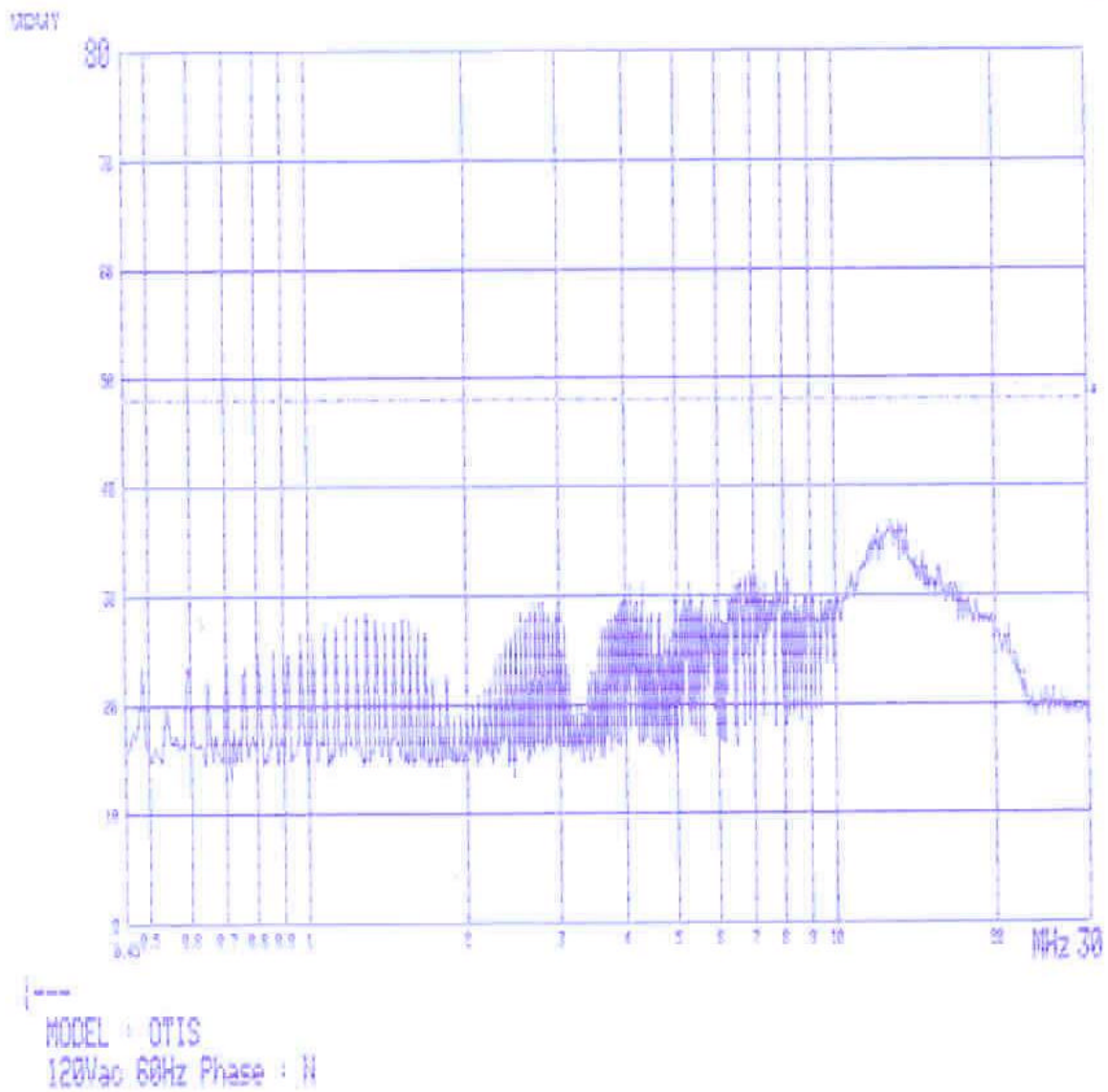
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.701	23.5	0.8	L1	24.3	48.0	23.7
0.861	22.1	0.8		22.9	48.0	25.1
7.061	24.2	0.8		25.0	48.0	23.0
8.122	24.5	0.8		25.3	48.0	22.7
12.419	32.1	0.8		32.9	48.0	15.1
12.781	32.0	0.8		32.8	48.0	15.2
4.099	28.8	0.8	N	29.6	48.0	18.4
4.307	28.5	0.8		29.3	48.0	18.7
5.287	30.1	0.8		30.9	48.0	17.1
5.5920	29.3	0.8		30.1	48.0	17.9
12.020	34.0	0.8		34.8	48.0	13.2
12.781	35.2	0.8		36.0	48.0	12.0
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 : Otis
 Manufacturer : Hyun Won Inc.
 Operation mode : Download files from Laptop to OTIS
 Test distance : 3 m
 Antenna : VULB9160
 Date : June 27, 2001.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
108.0	12.0	9.1	1.9	278	378	H	23.0	43.5	20.5
120.0	15.6	9.9	2.0	0	388	H	27.5	43.5	16.0
124.4	17.0	10.4	2.1	354	398	H	29.5	43.5	14.0
144.5	13.5	11.8	2.2	345	380	H	27.6	43.5	15.9
158.0	16.0	12.3	2.3	12	375	H	30.6	43.5	12.9
169.6	19.4	12.3	2.4	16	376	H	34.1	43.5	9.4
192.6	22.8	9.0	2.5	10	370	H	34.3	43.5	9.2
260.6	12.6	11.3	2.9	124	228	H	26.8	46.0	19.2
300.6	12.0	11.7	3.3	11	245	H	27.0	46.0	19.0
312.0	16.0	11.7	3.3	336	249	H	31.0	46.0	15.0
324.5	14.0	11.7	3.4	315	220	H	29.1	46.0	16.9
384.0	16.2	12.5	3.8	316	233	H	32.5	46.0	13.5
396.0	25.0	13.1	4.2	316	254	H	42.3	46.0	3.7
440.8	7.0	13.8	4.5	224	262	H	25.3	46.0	20.7

Radiation Test Data

Type : Otis
 Manufacturer : Hyun Won Inc.
 Operation mode : Play Mode
 Test distance : 3 m
 Antenna : VULB9160
 Date : June 27, 2001.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
214.5	18.2	8.4	2.6	354	345	H	29.1	43.5	14.4
225.8	19.0	9.1	2.8	0	278	H	30.9	46.0	15.1
237.1	22.0	9.9	2.9	345	265	H	34.8	46.0	11.2
248.4	24.7	10.7	2.8	324	268	H	38.2	46.0	7.8
259.7	26.1	11.2	2.9	323	264	H	40.2	46.0	5.8
270.9	24.0	11.6	3.0	12	228	H	38.6	46.0	7.4
282.2	19.6	11.9	3.1	13	247	H	34.6	46.0	11.4
293.5	26.5	11.8	3.2	7	245	H	41.4	46.0	4.6
304.8	27.4	11.7	3.3	321	244	H	42.4	46.0	3.6
316.1	22.4	11.7	3.4	182	245	H	37.5	46.0	8.5
338.7	23.7	11.7	3.5	175	235	H	38.9	46.0	7.1
350.0	23.0	11.7	3.6	324	224	H	38.3	46.0	7.7
361.3	22.8	11.7	3.6	321	245	H	38.1	46.0	7.9
372.6	21.8	12.1	3.7	124	214	H	37.6	46.0	8.4
383.8	23.1	12.5	3.8	135	220	H	39.4	46.0	6.6
395.1	23.3	13.1	4.2	245	216	H	40.6	46.0	5.4
406.4	22.7	13.3	4.3	0	218	H	40.3	46.0	5.7
417.7	20.0	13.5	4.4	245	219	H	37.8	46.0	8.2
429.0	18.7	13.7	4.4	124	220	H	36.8	46.0	9.3
440.3	17.6	13.8	4.5	133	216	H	35.9	46.0	10.1
451.6	17.3	14.0	4.5	344	248	H	35.8	46.0	10.2
462.8	17.2	14.3	4.7	324	216	H	36.1	46.0	9.9
474.2	15.0	14.3	4.7	326	222	H	33.9	46.0	12.1
485.4	14.2	14.6	4.8	349	220	H	33.6	46.0	12.5
496.7	10.0	14.8	4.8	354	235	H	29.6	46.0	16.4

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 : June 26, 2001

End of testing : June 27, 2001

Reviewed by :

Approved by :

Joan H Lee

Joon H. Lee. EMC Manager
IST EMC Lab.

Qin Meng

G. Chung Chief of EMC Lab.