Certification of Compliance

CFR 47 Part 15 Subpart B

Test Report File No. : 05-IST-0224 **Date of Issue** : June 29, 2005

Model(s)	:	**DAH-1500i**
Kind of Product	:	MP3 PLAYER
FCC ID	:	PCMDAH1500I
Applicant	:	Hyun Won Inc.
Address	:	333-1, Shindae-Ri, Kumho-Eup, Youngcheon-City, Kyoungbuk, South Korea
Manufacturer	:	Hyun Won Inc.
Address	:	333-1, Shindae-Ri, Kumho-Eup, Youngcheon-City, Kyoungbuk, South Korea

Test Result ■ **Positive** ☐ **Negative**

Reviewed By

S.J.CHO / EMC Group Manager

Approved By

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 22 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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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	23 ℃
Humidity	60 %
Atmospheric pressure	1005 mbar

POWER SUPPLY SYSTEM USED

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

PRODUCT INFORMATION

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

Model Name		DAH-1500i
FCC ID		PCMDAH1500I
Category	Item	Specification
FM TUNER	FM Frequency Range	87.5MHz~108.0MHz / 76.0MHz ~ 108.0MHz
	Headphone output	Max. 7mW(16) at max. volume
	S/N Ratio	50dB
	Antenna	Headset/earphone antenna
	Frequency Characteristics	20Hz~20KHz
Audio	Headphone output	Max. 15mW(16) at max. volume
	S/N Ratio	90dB
File Support	File Format	MP3, WMA, WMA DRM
	Bit Rate	MP3 : 8 ~ 320Kbps, WMA : 32 ~ 192Kbps
USB	Download speed	25Mbps(USB Ver. 2.0)
Recording Time		520min voice recording(256MB, 64Kbps Recording mode))
Memory		1GB
Max. Running time		10 hours
Size (WxHxD)		24x24x24mm
Weight		18g
Operating Temperature		-5°C ~ 70°C
Battery (Built-in)		Li-Polymer

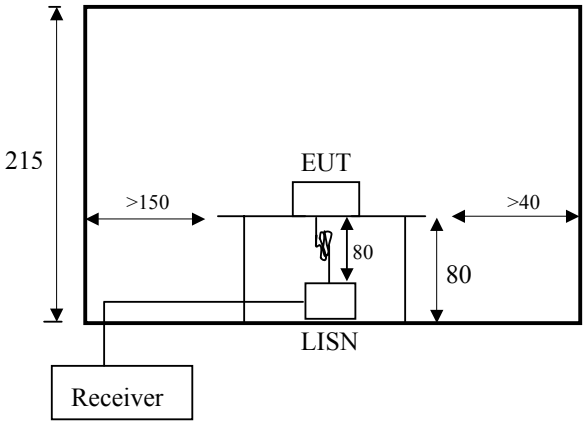
DESCRIPTIONS OF TEST

Conducted Emissions:

The measurement were performed over the frequency range of 0.15MHz to 30MHz using a 50Ω/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 ESH3 and EMCO 3725/2 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 EMCO 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 ϕ 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.



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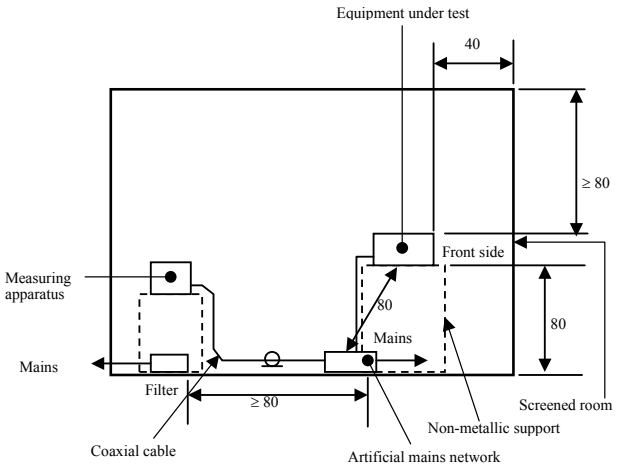


< Concept Drawing >

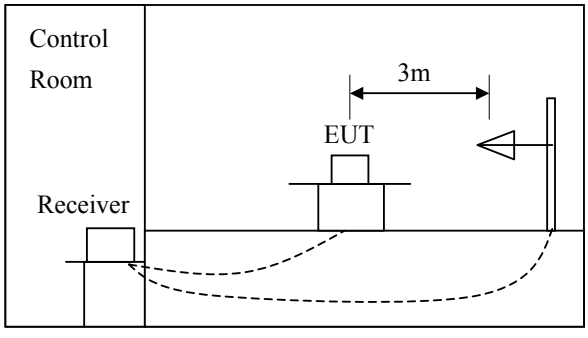
DESCRIPTION OF TEST

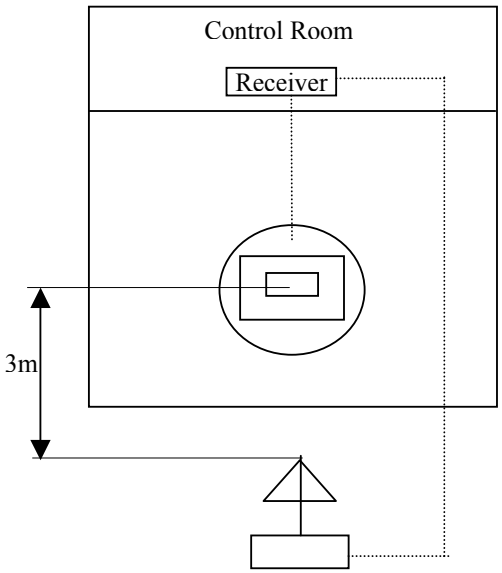
Radiated Emissions:

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 300MHz using S/B bi-conical antenna and 300 to 1000MHz using S/B log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using S/B bi-log antenna or horn 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.





Equipment Under Test

EUT Type :

■ Table-Top. ☐ Floor-Standing.

☐ Table-Top and Floor-Standing(Combination).

Operation – mode of the E.U.T. :

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

☐ Standby Mode

■ Operational Condition : ■ File up/download mode
■ FM receiving mode
■ Playback mode

Configuration of the equipment under test :

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

Equipment	Type	Brand	Serial No.
Notebook Computer	Latitude D505	DELL	CN-0H2049-48643-492-0444
Adapter	PA-1650-05DK	DELL	CN-0D1100-71615-47U-00D1
LCD Monitor	HSTND-2A04	HP	N/A
Mouse(Serial)	M-M48	Logitech	LCA53305547
Printer	A0302380	Northen Telecom	N/A

Connecting Interface Cables :
Shielded monitor's signal cable(with two ferrite core) : 1.8 m
Shielded Printer's signal cable(with two ferrite core) : 1.8 m
Unshielded Mouse(Serial) cable(without ferrite core) : 1.8 m
Unshielded USB cable(with one ferrite core) : 1.2 m
Unshielded Earphone cable(without ferrite core) : 0.6 m

Note :

SUMMARY

Emissions

■ Conducted Emission

The requirements are ● MET ○ Not MET
Minimum limit margin 19.4 dB at 0.180 MHz
Maximum limit exceeding
Remarks : With Live phase, for Q-peak detect mode.
(File up/download mode)
Find the test data in following pages 8 to 10.

■ Radiated Emission

The requirements are ● MET ○ Not MET
Minimum limit margin 4.0 dB at 184.5 MHz
Maximum limit exceeding
Remarks : File playback mode.
Find the test data in following page 11 to 17.

Test Date

Begin of Testing : June 25, 2005
End of Testing : June 28, 2005

Prepared By

J.H.Park / Research Engineer

Note :

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

TEST CONDITIONS AND DATA

Conducted Emissions

[Applicable]

◆ Test Equipment Used

Model Name	Description	Manufacture	Calibration Date	Serial Number
ESH3	Test Receiver	Rohde & Schwarz	Jul. 15, 2004	892108/018
3725/2	LISN	EMCO	Jul. 15, 2004	9101-2068
KNW-407	LISN	Hyup-Rip	Jul. 15, 2004	8-883-10
ESH3-Z2	Pulse Limiter	Rohde & Schwarz	Jul. 15, 2004	357.8810.52

◆ Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

◆ Test Program File up/download mode

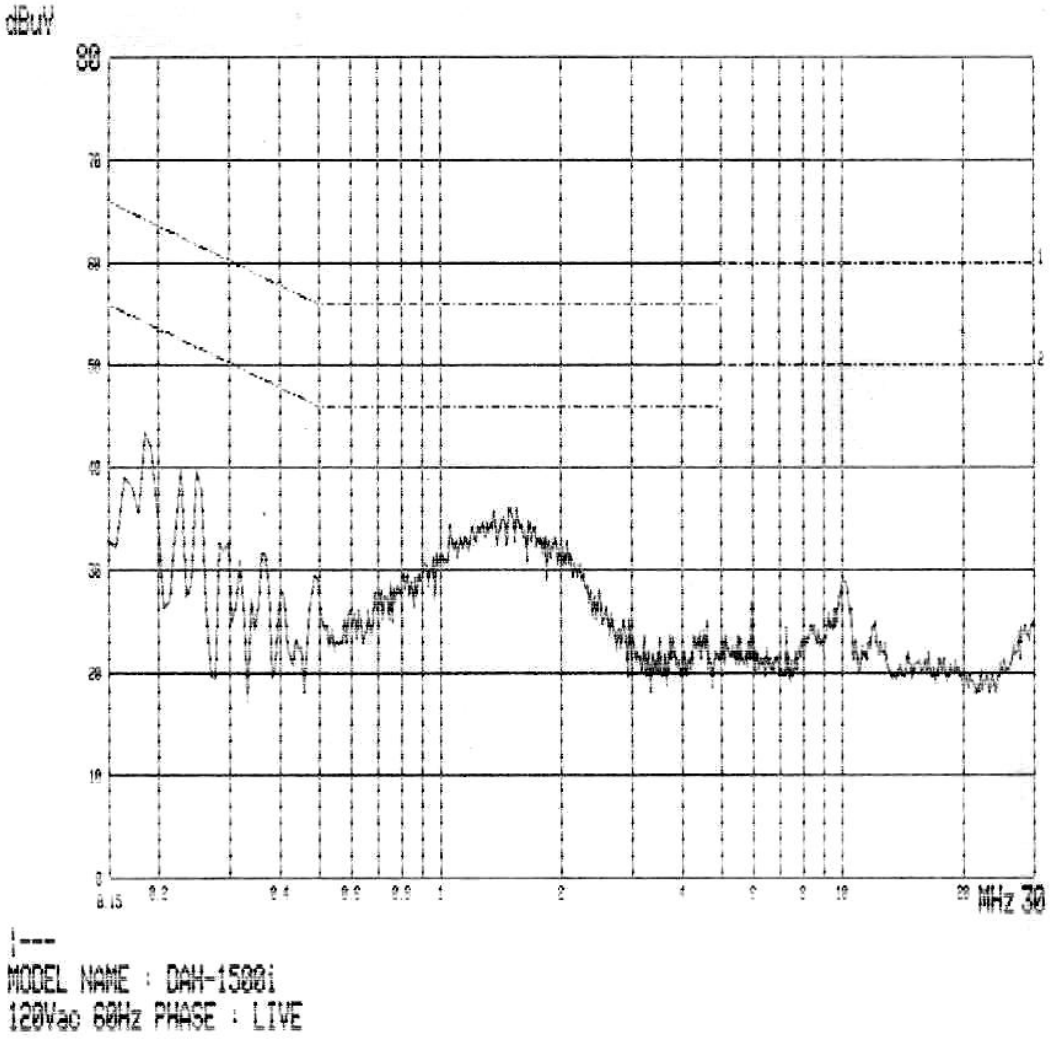
◆ Test Date June 27, 2005

◆ Test Area Conducted room No.1

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

Conducted Emissions

Live Phase

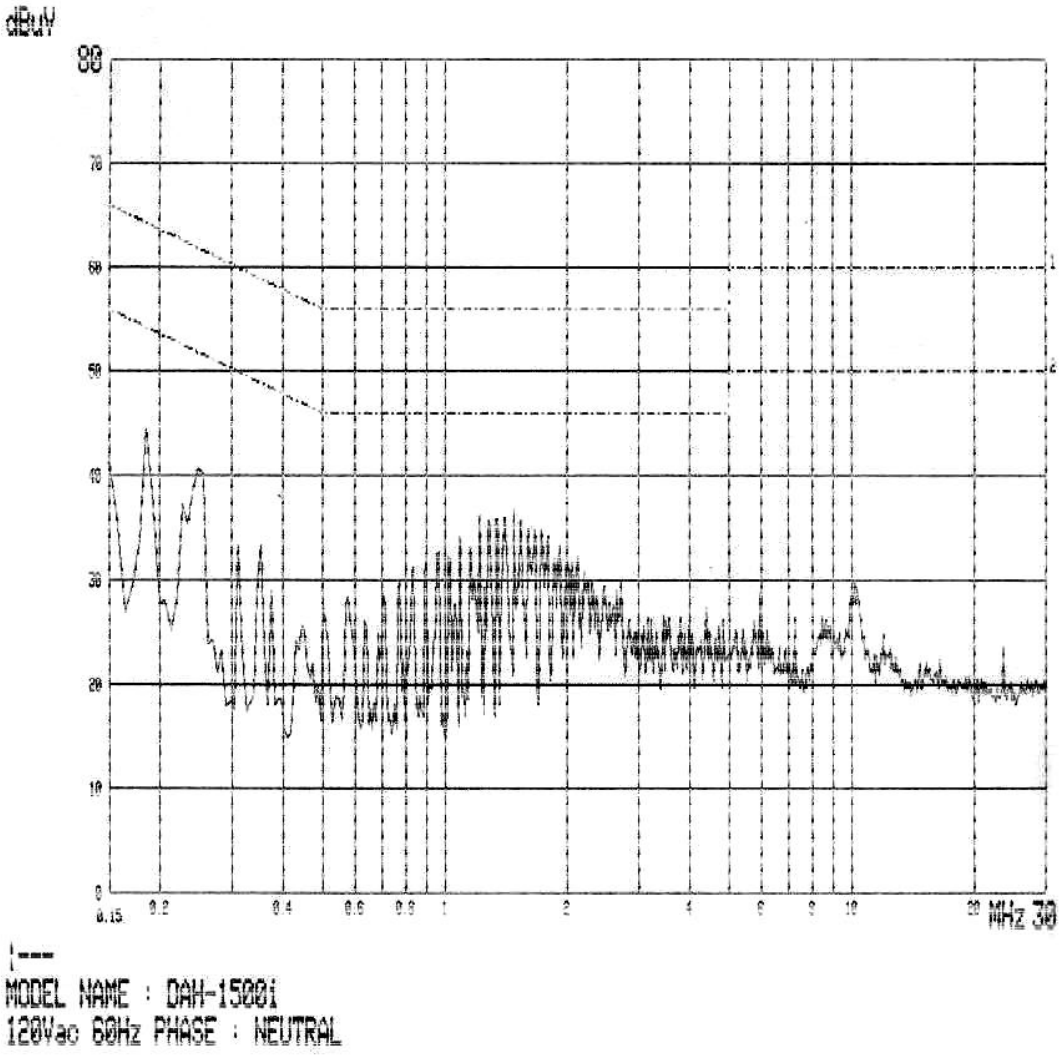


Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Insertion Loss	Cable Loss	Result [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB μV]	Q-peak	Average	Q-peak	Average
0.170	43.9	21.9	65.0	55.0	0.2	0.5	44.6	22.6	20.3	32.3
0.180	44.5	26.9	64.5	54.5	0.3	0.5	45.3	27.7	19.2	26.8
0.224	38.9	14.0	62.7	52.7	0.3	0.5	39.7	14.8	23.0	37.9
1.477	33.6	17.2	56.0	46.0	0.3	0.6	34.5	18.1	21.5	27.9
1.639	30.7	21.4	56.0	46.0	0.3	0.6	31.6	22.3	24.4	23.7
8.296	21.5	14.5	60.0	50.0	0.4	0.7	22.5	15.5	37.5	34.5
9.944	25.8	16.0	60.0	50.0	0.5	0.6	26.9	17.1	33.1	32.9

Note :

Conducted Emissions

Neutral Phase



Freq. [MHz]	Measurement [dB μV]		Limit [dB μV]		Insertion Loss	Cable Loss	Result [dB μV]		Margin [dB]	
	Q-peak	Average	Q-peak	Average	[dB]	[dB μV]	Q-peak	Average	Q-peak	Average
0.170	41.1	20.0	65.0	55.0	0.2	0.5	41.8	20.7	23.1	34.2
0.241	37.5	20.9	62.1	52.1	0.3	0.5	38.3	21.7	23.8	30.4
0.354	31.5	24.6	58.9	48.9	0.4	0.4	32.3	25.4	26.5	23.4
1.143	31.8	23.5	56.0	46.0	0.3	0.5	32.6	24.3	23.4	21.7
1.664	30.6	21.2	56.0	46.0	0.3	0.6	31.4	22.0	24.6	24.0
5.953	26.6	24.5	60.0	50.0	0.4	0.6	27.6	25.5	32.4	24.5
10.020	22.8	13.1	60.0	50.0	0.4	0.6	23.8	14.1	36.2	35.9

Note :

TEST CONDITIONS AND DATA

Radiated Emission

[Applicable]

◆ Test Equipment Used

Name	Type	Manufacturer	Calibration. Date	Serial Number
ESVP	Test Receiver	Rohde & Schwarz	Jul. 15, 2004	861744/004
VULB 9160	Antenna	Schwarzbeck	Jul. 10, 2004	3047

◆ Test Accessories Used

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

◆ Test Program — File up/download mode
FM receiving mode
Playback mode

◆ Test Date — June 28, 2005

◆ Test Area — Open site No.2

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

Radiated Emissions

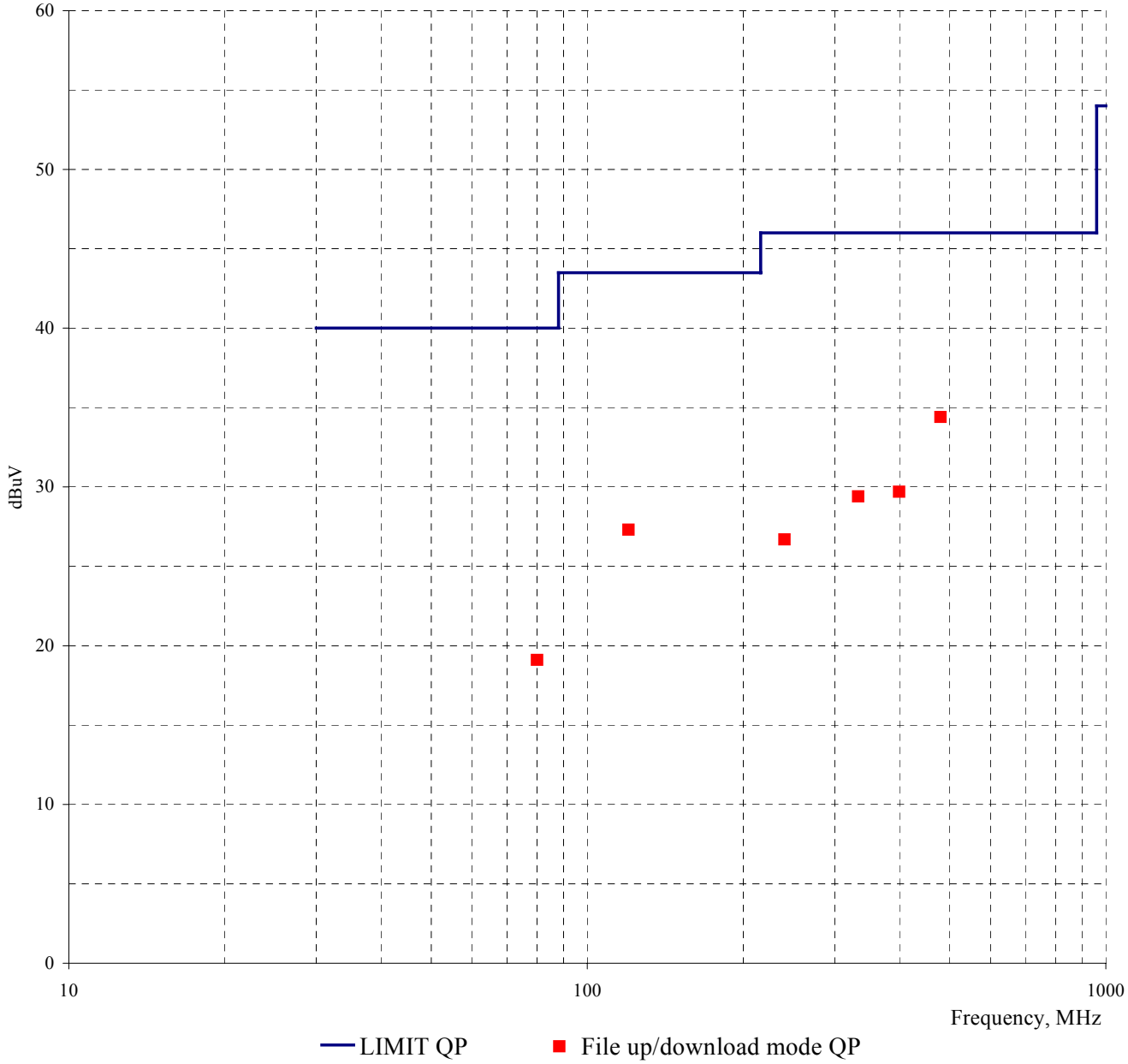
(Disturbance Radiation)

[Applicable]

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
80.0	9.1	8.0	2.0	H	19.1	40.0	20.9
120.0	13.3	11.4	2.6	H	27.3	43.5	16.2
240.0	12.0	10.8	3.9	V	26.7	46.0	19.3
332.9	11.5	13.3	4.6	V	29.4	46.0	16.6
399.3	10.1	14.5	5.1	H	29.7	46.0	16.3
480.0	12.0	16.5	5.9	V	34.4	46.0	11.6

Note: ***File up/download mode***

MEASUREMENT OF DISTURBANCE RADIATION

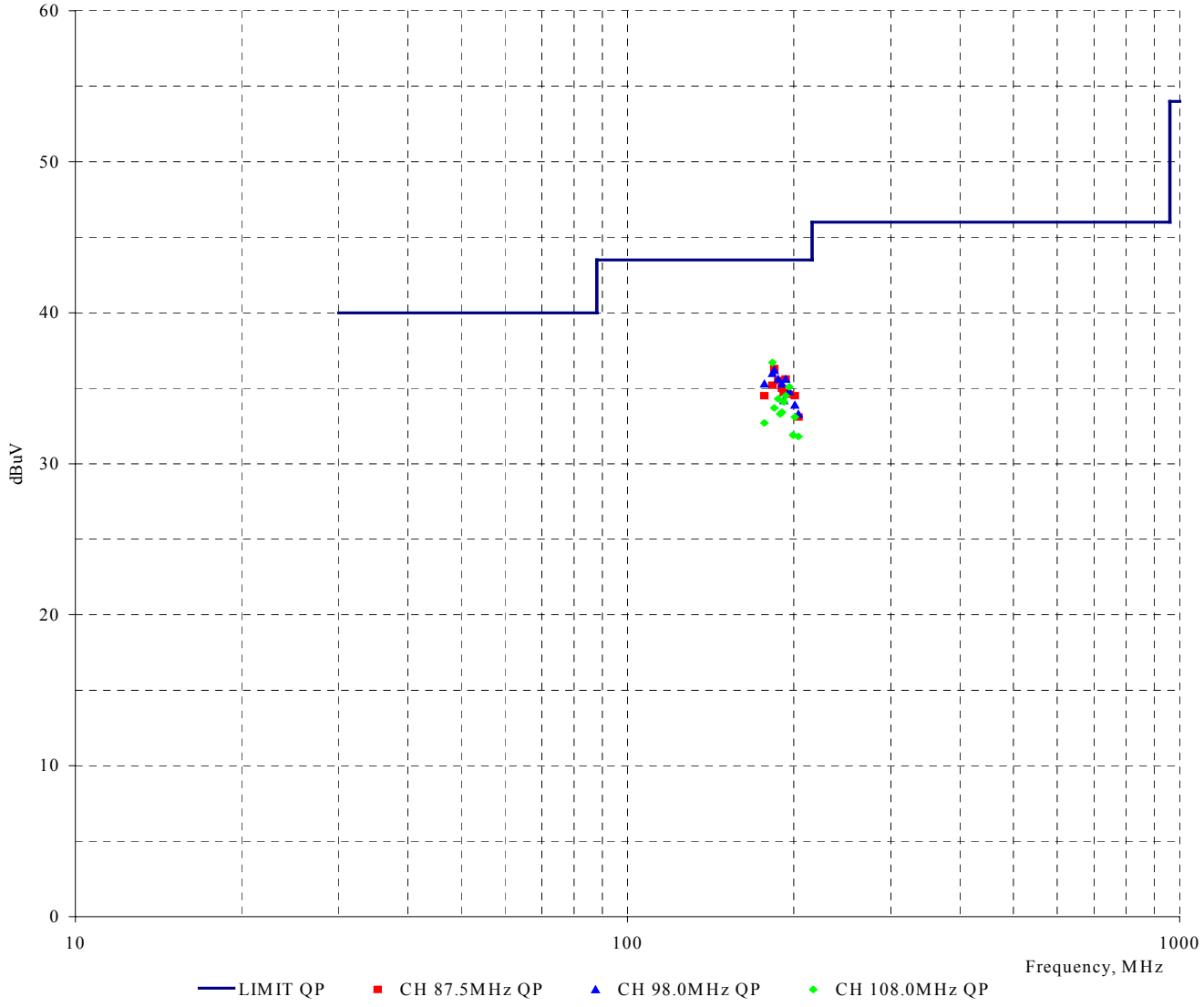


[Applicable]

CH Freq. [MHz]	Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
87.5	177.0	19.9	11.5	3.1	H	34.5	43.5	9.0
	183.0	21.2	10.8	3.2	H	35.2	43.5	8.3
	184.5	22.4	10.7	3.2	H	36.3	43.5	7.2
	187.5	22.0	10.3	3.2	H	35.5	43.5	8.0
	190.5	21.6	10.1	3.3	H	35.0	43.5	8.5
	192.0	21.4	10.0	3.3	H	34.7	43.5	8.8
	193.5	22.4	9.9	3.3	H	35.6	43.5	7.9
	196.5	21.8	9.5	3.3	H	34.6	43.5	8.9
	201.0	22.0	9.2	3.3	H	34.5	43.5	9.0
	204.0	20.6	9.2	3.3	H	33.1	43.5	10.4
98.0	177.0	20.7	11.5	3.1	H	35.3	43.5	8.2
	183.0	22.0	10.8	3.2	H	36.0	43.5	7.5
	184.5	22.3	10.7	3.2	H	36.2	43.5	7.3
	187.5	22.1	10.3	3.2	H	35.6	43.5	7.9
	190.5	21.9	10.1	3.3	H	35.3	43.5	8.2
	192.0	20.9	10.0	3.3	H	34.2	43.5	9.3
	193.5	22.4	9.9	3.3	H	35.6	43.5	7.9
	196.5	22.0	9.5	3.3	H	34.8	43.5	8.7
	201.0	21.4	9.2	3.3	H	33.9	43.5	9.6
	204.0	20.8	9.2	3.3	H	33.3	43.5	10.2
108.0	177.0	18.1	11.5	3.1	H	32.7	43.5	10.8
	183.0	22.7	10.8	3.2	H	36.7	43.5	6.8
	184.5	19.8	10.7	3.2	H	33.7	43.5	9.8
	187.5	20.8	10.3	3.2	H	34.3	43.5	9.2
	189.0	19.9	10.2	3.2	H	33.3	43.5	10.2
	190.5	20.0	10.1	3.3	H	33.4	43.5	10.1
	192.0	20.8	10.0	3.3	H	34.1	43.5	9.4
	193.5	21.3	9.9	3.3	H	34.5	43.5	9.0
	196.5	22.3	9.5	3.3	H	35.1	43.5	8.4
	199.5	19.4	9.2	3.3	H	31.9	43.5	11.6
	201.0	20.6	9.2	3.3	H	33.1	43.5	10.4
	204.0	19.3	9.2	3.3	H	31.8	43.5	11.7

Note ***:FM receiving mode***

MEASUREMENT OF DISTURBANCE RADIATION

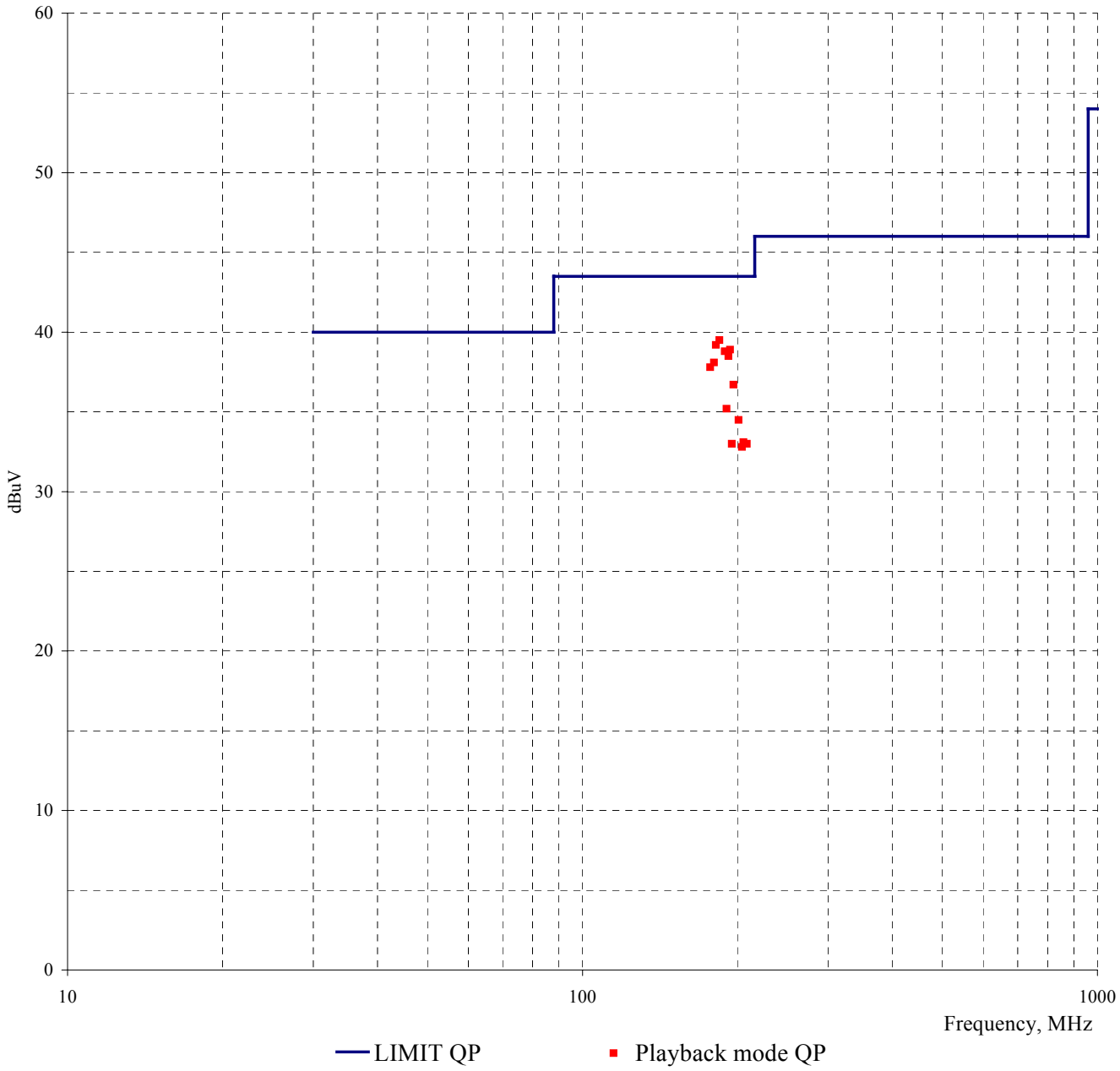


[Applicable]

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB/m]	Cable Loss [dB]	Polar. [H/V]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
177.0	23.2	11.5	3.1	H	37.8	43.5	5.7
180.0	23.8	11.1	3.2	H	38.1	43.5	5.4
181.5	25.0	11.0	3.2	H	39.2	43.5	4.3
184.5	25.6	10.7	3.2	H	39.5	43.5	4.0
189.0	25.4	10.2	3.2	H	38.8	43.5	4.7
190.5	21.8	10.1	3.3	H	35.2	43.5	8.3
192.0	25.2	10.0	3.3	H	38.5	43.5	5.0
193.5	25.7	9.9	3.3	H	38.9	43.5	4.6
195.0	20.1	9.6	3.3	H	33.0	43.5	10.5
196.5	23.9	9.5	3.3	H	36.7	43.5	6.8
201.0	22.0	9.2	3.3	H	34.5	43.5	9.0
204.0	20.3	9.2	3.3	H	32.8	43.5	10.7
205.5	20.6	9.2	3.3	H	33.1	43.5	10.4
208.5	20.5	9.2	3.3	H	33.0	43.5	10.5

Note: ***Playback mode***

MEASUREMENT OF DISTURBANCE RADIATION

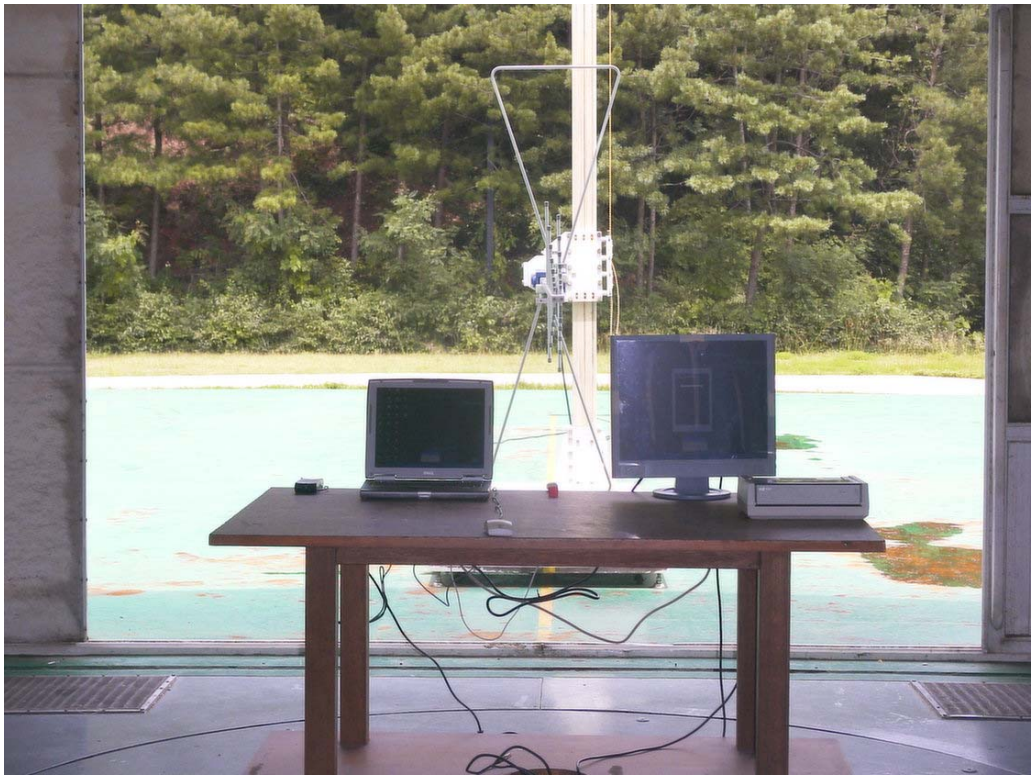


Appendix A. The Photos of Test Setup

Conducted Emissions(File up/download mode) - Front View

Conducted Emissions(File up/download mode) - Rear View

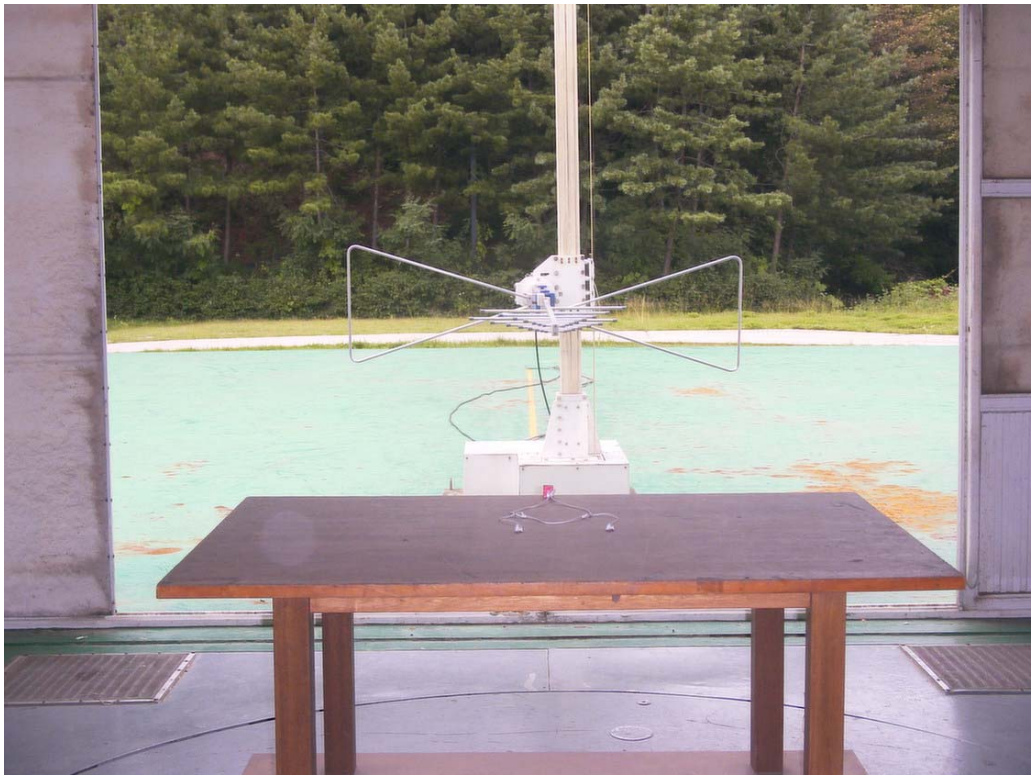
Appendix A. The Photos of Test Setup



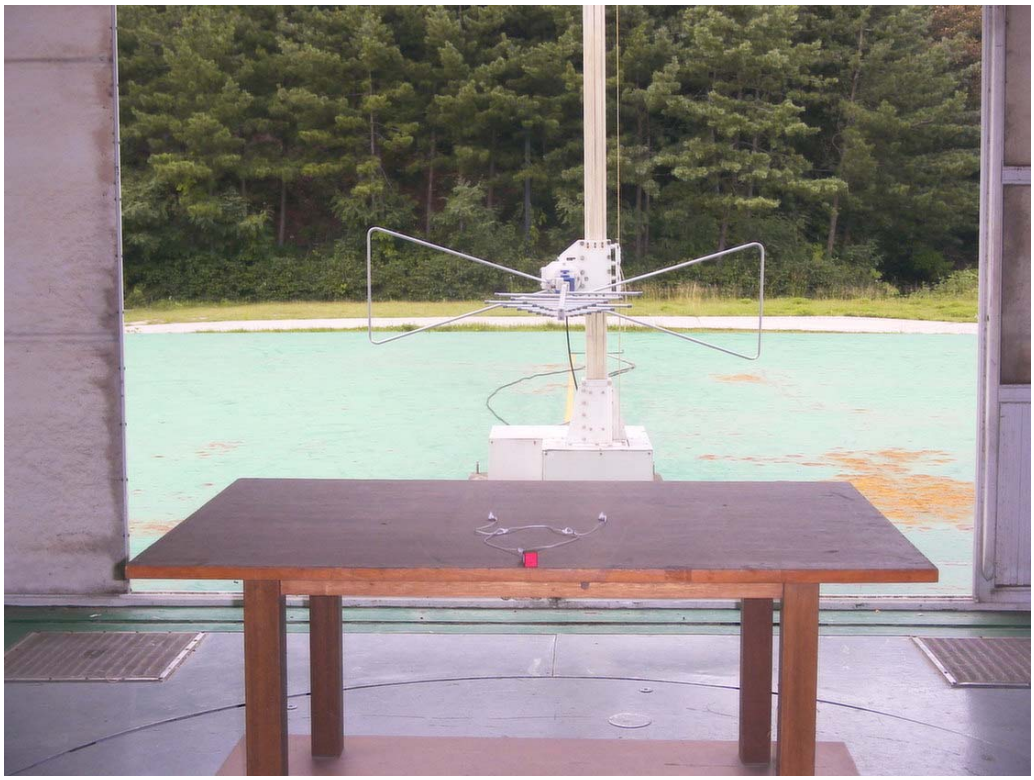
Radiated Emissions(File up/download mode) - Front View

Radiated Emissions(File up/download mode) - Rear View

Appendix A. The Photos of Test Setup



Radiated Emissions(FM receiving, Playback mode)-Front View



Radiated Emissions(FM receiving, Playback mode)-Rear View

Appendix B. The Photos of Equipment Under Test

Front View

Rear View

Appendix B. The Photos of Equipment Under Test

USB Cable

Earphone