



E M I S S I O N T E S T R E P O R T

Test report file No. : **02-IST-262/FB** Date of issue : Dec. 17, 2002.

Model / Type No. : CA-T100 ☒ Basic ☐ Alternate
 : CA-T100MF
 : CA-T100EMF

Kind of product : MP3 Player

Brand name : LIVE MUSIC.

Applicant : CM Tech Co., Ltd.

Manufacturer : CM Tech Co., Ltd.

Address : 4F, Samil B/D, 362-5, Woncheon-Dong, Paldal-Gu, Suwon-City,
 Kyungki-Do, KOREA.

Test result according to the regulation(s)

☒ Positive ☐ Negative

at page 3.

This test report without appendix consists of 22 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

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B) Test Data.

Conducted emissions (Mains)	: 450 kHz - 30 MHz	<u>13~15</u>
Radiated emissions	: 30 MHz – 1 GHz	<u>16~21</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.

ENVIRONMENTAL CONDITIONS

Temperature	<u>14</u>
Humidity	<u>32</u> %
Atmospheric pressure	<u>1005</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 :

Name	Type	Manufacturer	Calibration. Date	Serial Number
ESH 3	Test Receiver	Rohde & Schwarz	Jul. 25, 2002	892108/018
3725/2	LISN	EMCO	Aug. 22, 2002	9101-2068
KNW-407	LISN	Hyup-Rip	Aug. 21, 2002	8-883-10
ESH 3-Z2	Pulse Limiter	Rohde & Schwarz	Jul. 25, 2002	357.8810.52

Test - accessories :

Type	Manufacturer
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 :



Y. J. Kim / 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 :

Location : ☒ Open Site No. 1 ☐ Open Site No. 2 ☐ Open Site No. 3
 Distance : ☒ 3 meters ☐ 10 meters

Used testing instruments :

Name	Type	Manufacturer	Calibration. Date	Serial Number
ESVP	Test Receiver	Rohde & Schwarz	Aug. 16, 2002	861744/004
VULB 9160	Antenna	Schwarzbeck	Jul. 10, 2002	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 :



Y. J. Kim / Research Engineer
IST EMC Lab.

EQUIPMENT UNDER TEST

Equipment Description

Display	FSTN LCD
Weight	37g
Memory	64MB Flash Memory, 128MB Flash Memory
Interface	USB
File Transmission Speed	2.7Mbps
Dimension	52 x 60 x 14(mm) : W x H x D
Battery	AAA x 1 (1.5V)
Battery Life	6 Hours (Play / Record)
Output Power	4.5mW x 2(16Ω)

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.
☒ Operational Condition : - Download files from PC to EUT, play mode, REC mode

Configuration of the equipment under test :

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

Equipment	Type	Brand	Serial No
PC	Vectra VL420 MT	HP	SG23101785
Monitor	529B	DAEWOO	N/A
Keyboard	SK-2502C	HP	M020321157
Mouse(PS/2)	M-S48a	HP	LZE20602910
Mouse(Serial)	M-M28	Logitech	LCA53305547
Printer	A0302380	Northern Telecom	25L9S60856

Connecting Interface Cables & Ports :

- Shielded monitor's signal cable : 1.5m
- Shielded printer's signal cable : 1.5 m
- USB I/O cable : 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

11.0 dB

at 13.8743 MHz

Remarks : See test-graph to be attached at pages 13~15.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

12.1 dB

at 287.6 MHz

Remarks : See test-data at page 18~19.

<Play mode>

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

12.1 dB

at 287.6 MHz

Remarks : See test-data at page 16~17.

<REC mode>

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are.

☒ KEPT

☐ NOT KEPT

Min. limit margin

14.9 dB

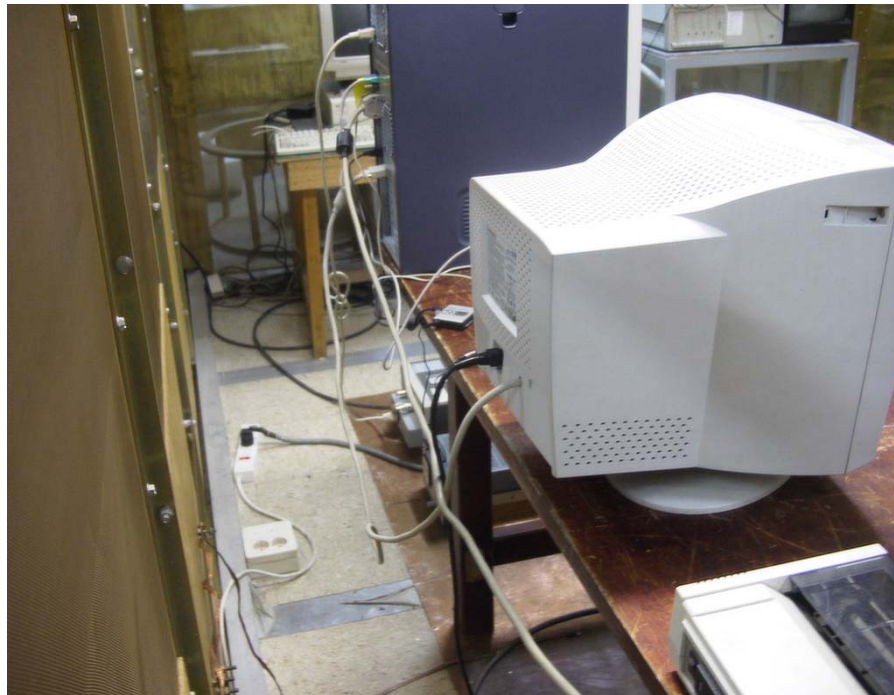
at 279.3 MHz

Remarks : See test-data at page 20~21.

**Test Set-Up
(Type : CA-T100)**



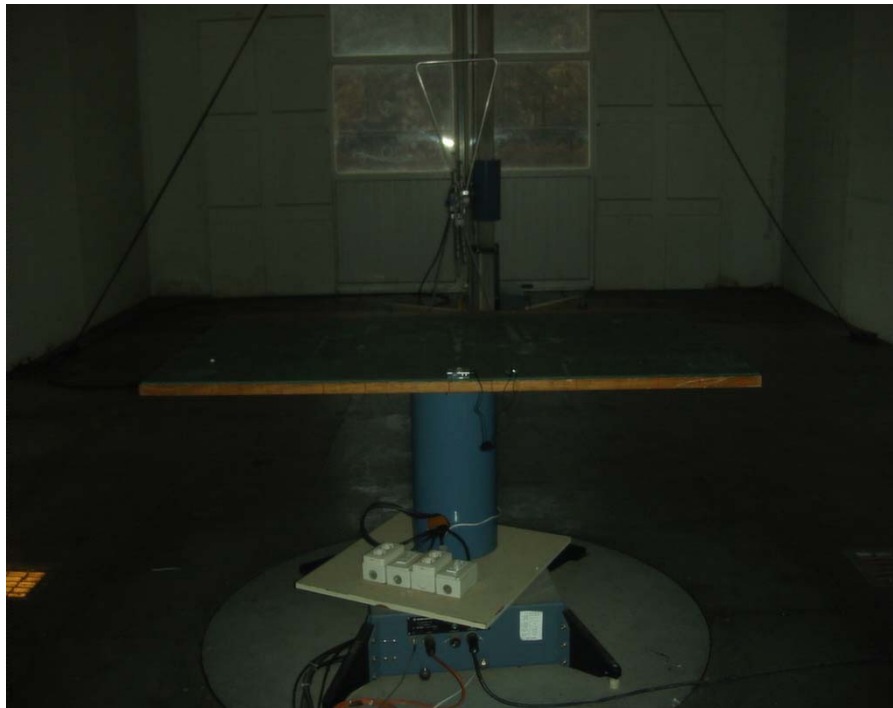
Conducted emission : 450kHz ~ 30MHz



Test Set-Up
(Type : CA-T100, Mode : Play)



Radiated emission : 30MHz ~ 1000MHz

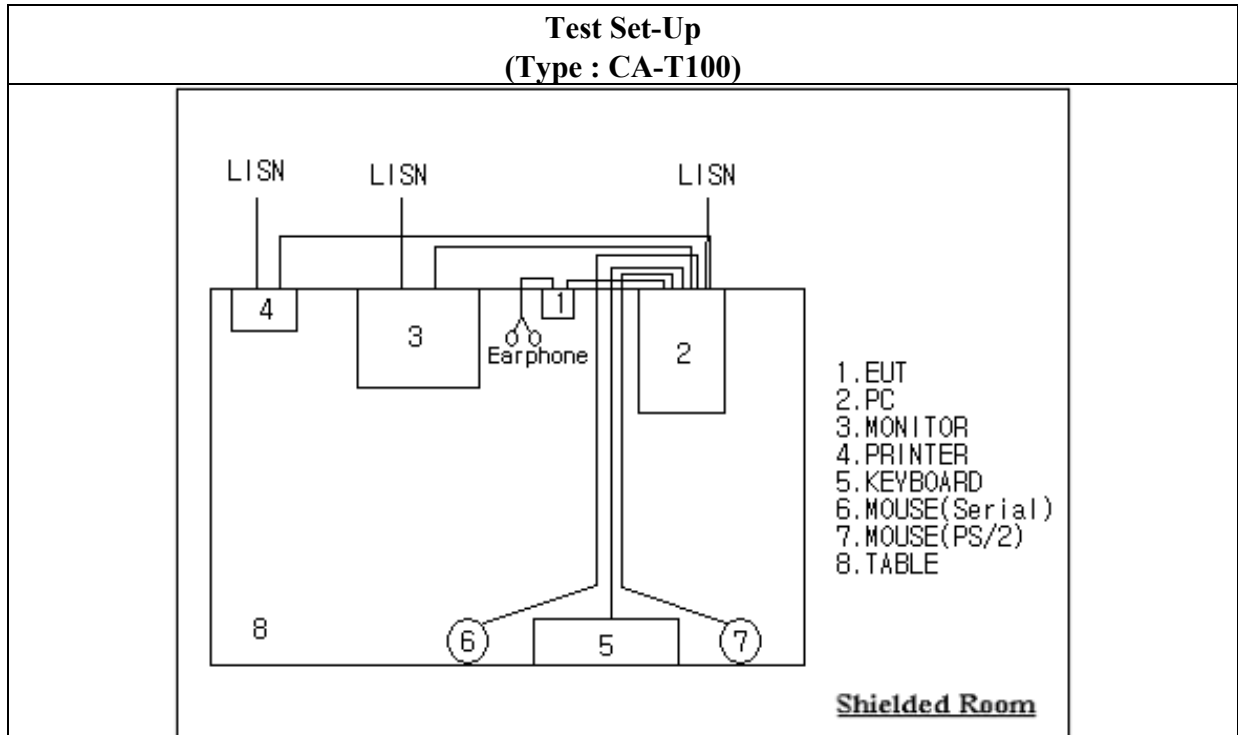


Test Set-Up
(Type : CA-T100, Mode : Down load)

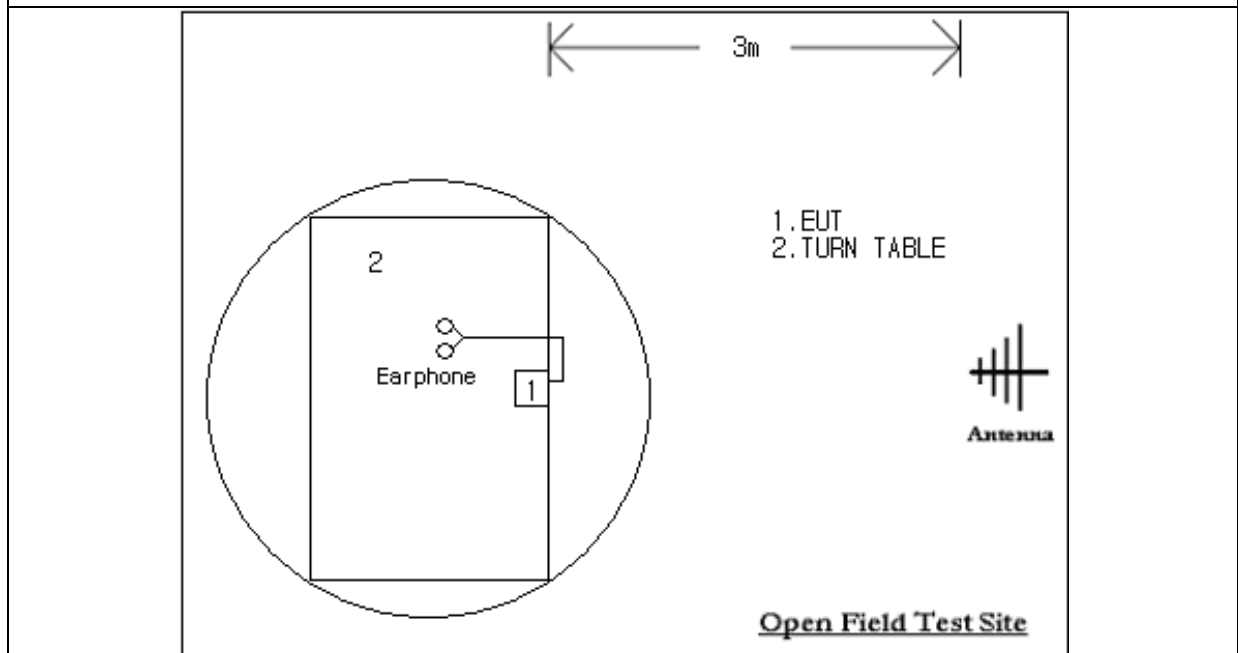


Radiated emission : 30MHz ~ 1000MHz

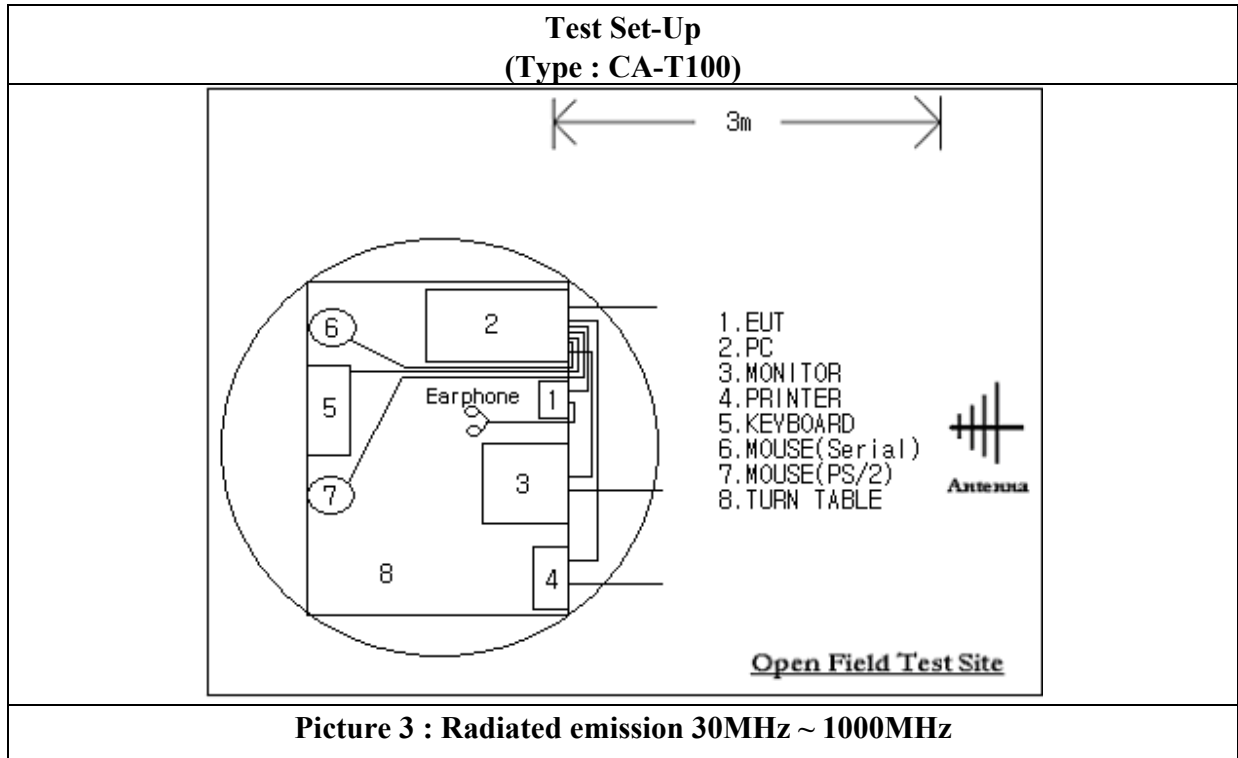




Picture 1 : Conducted emission 450kHz ~ 30MHz



Picture 2 : Radiated emission 30MHz ~ 1000MHz



Conducted Emission Test Data

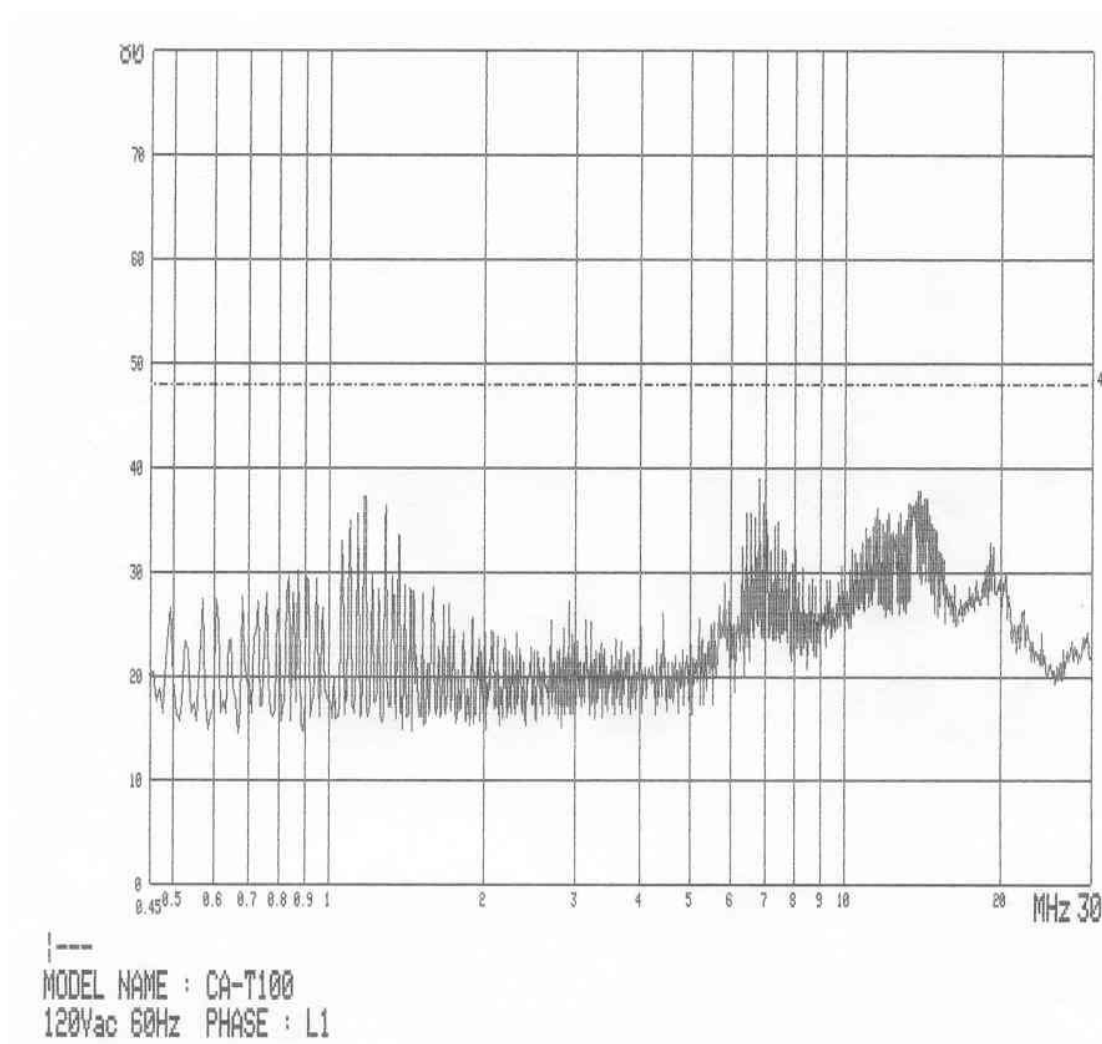
Type : CA-T100
 Manufacturer : CM Tech Co., Ltd
 Operation mode : download mode
 Date : Dec. 04, 2002

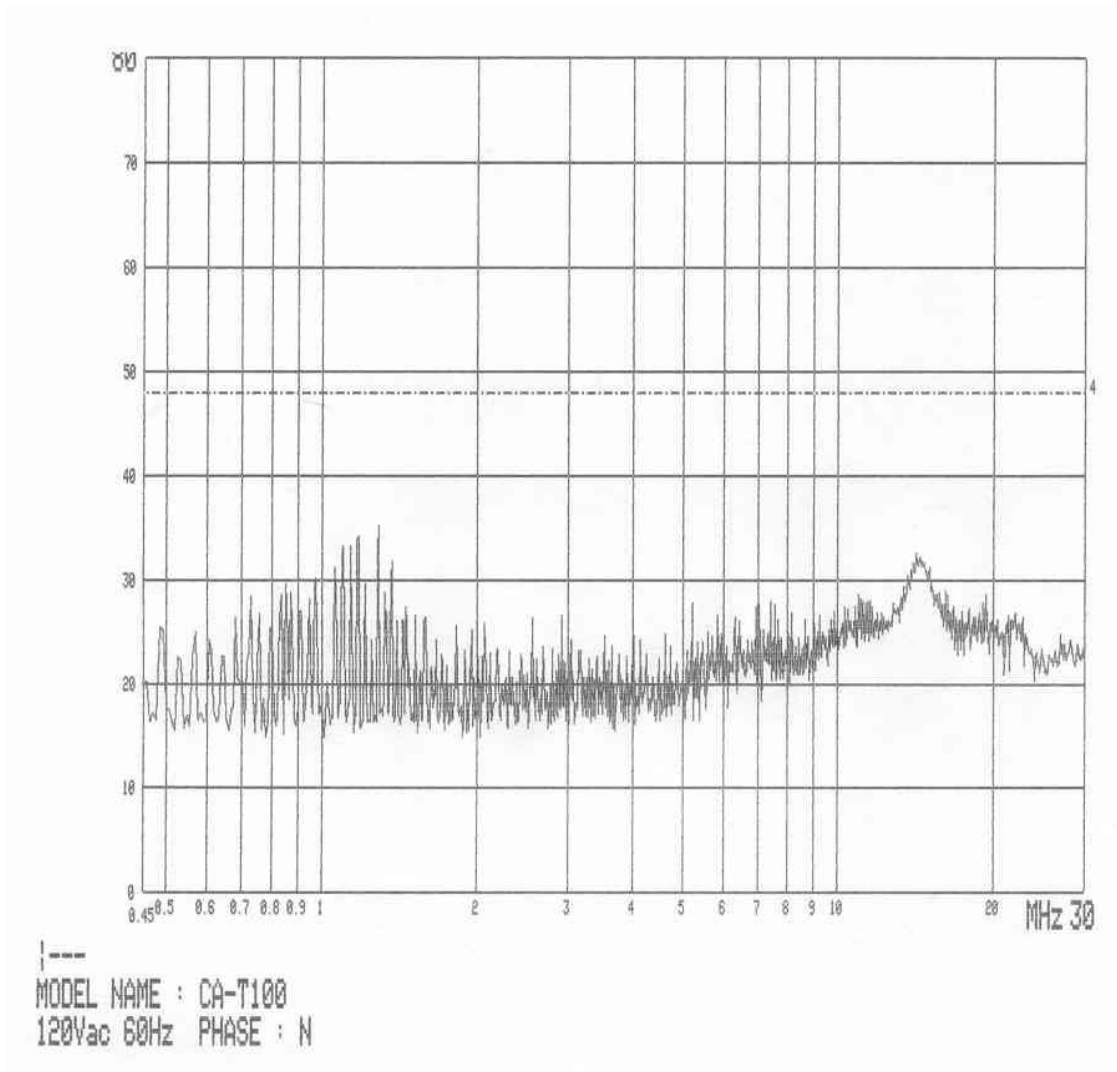
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
1.1744	35.1	0.8	L1	36.0	48.0	12.0
6.8156	34.6	0.8		35.0	48.0	13.0
13.8743	36.0	0.8		37.0	48.0	11.0
1.2901	34.0	0.8	N	35.0	48.0	13.0
1.1745	33.3	0.8		34.0	48.0	14.0
14.1793	29.3	0.8		30.0	48.0	18.0
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

*** Please refer to data graphs at page 14~ 15



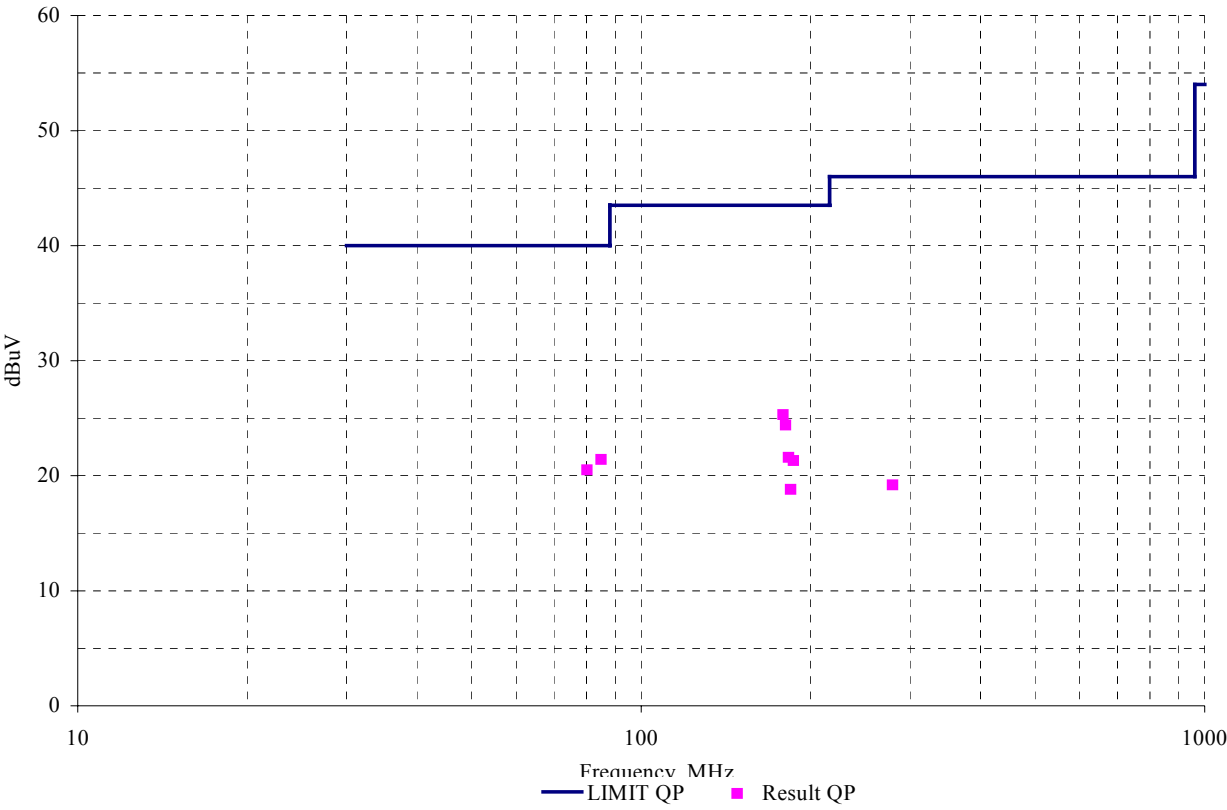


Radiation Test Data

Type : CA-T100
 Manufacturer : CM Tech Co., Ltd.
 Operation mode : Play mode
 Test distance : 3 m
 Antenna : VULB9160
 Date : Dec. 16, 2002.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
80.1	11.2	7.7	1.6	288	100	V	20.5	40.0	19.5
84.9	12.4	7.3	1.6	246	100	V	21.4	40.0	18.6
178.5	12.0	10.9	2.4	276	325	H	25.3	43.5	18.2
180.4	11.5	10.5	2.4	0	333	H	24.4	43.5	19.1
182.6	9.0	10.1	2.4	114	378	H	21.6	43.5	21.9
184.2	6.4	10.0	2.4	270	284	H	18.8	43.5	24.7
186.3	9.2	9.6	2.5	186	276	H	21.3	43.5	22.2
279.3	4.3	11.8	3.1	224	300	H	19.2	46.0	26.8

MEASUREMENT OF DISTURBANCE RADIATION

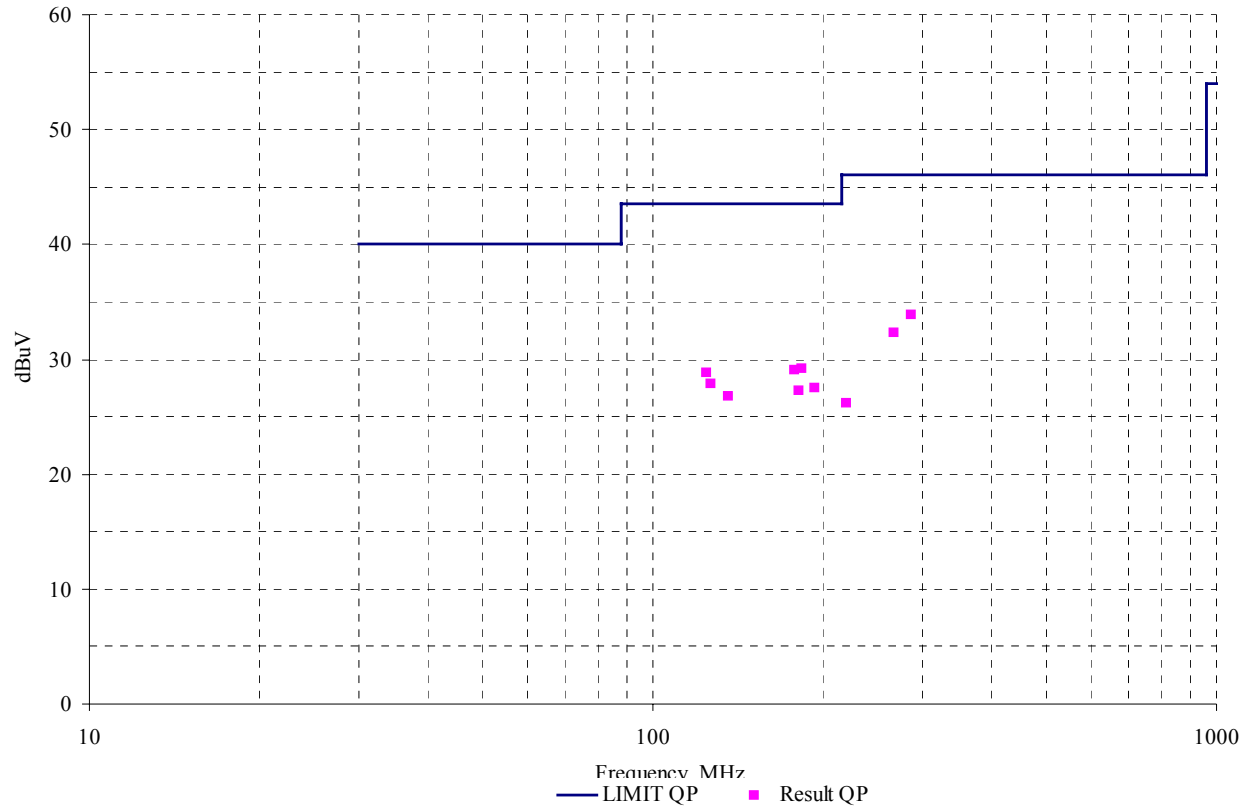


Radiation Test Data

Type : CA-T100
 Manufacturer : CM Tech Co., Ltd.
 Operation mode : download mode
 Test distance : 3 m
 Antenna : VULB9160
 Date : Dec. 16, 2002.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
124.7	16.4	10.4	2.1	342	100	V	28.9	43.5	14.6
126.2	15.3	10.5	2.1	360	105	V	27.9	43.5	15.7
135.7	13.7	11.0	2.1	241	349	H	26.8	43.5	16.7
178.3	15.8	10.9	2.4	213	278	H	29.1	43.5	14.4
181.4	14.6	10.3	2.4	300	261	H	27.3	43.5	16.2
183.9	16.8	10.0	2.4	12	258	H	29.2	43.5	14.3
193.1	16.0	9.0	2.5	167	230	H	27.5	43.5	16.0
220.5	14.9	8.5	2.8	246	345	H	26.2	46.0	19.8
267.4	18.0	11.5	3.0	259	211	H	32.4	46.0	13.6
287.6	19.0	11.8	3.1	220	260	H	33.9	46.0	12.1

MEASUREMENT OF DISTURBANCE RADIATION

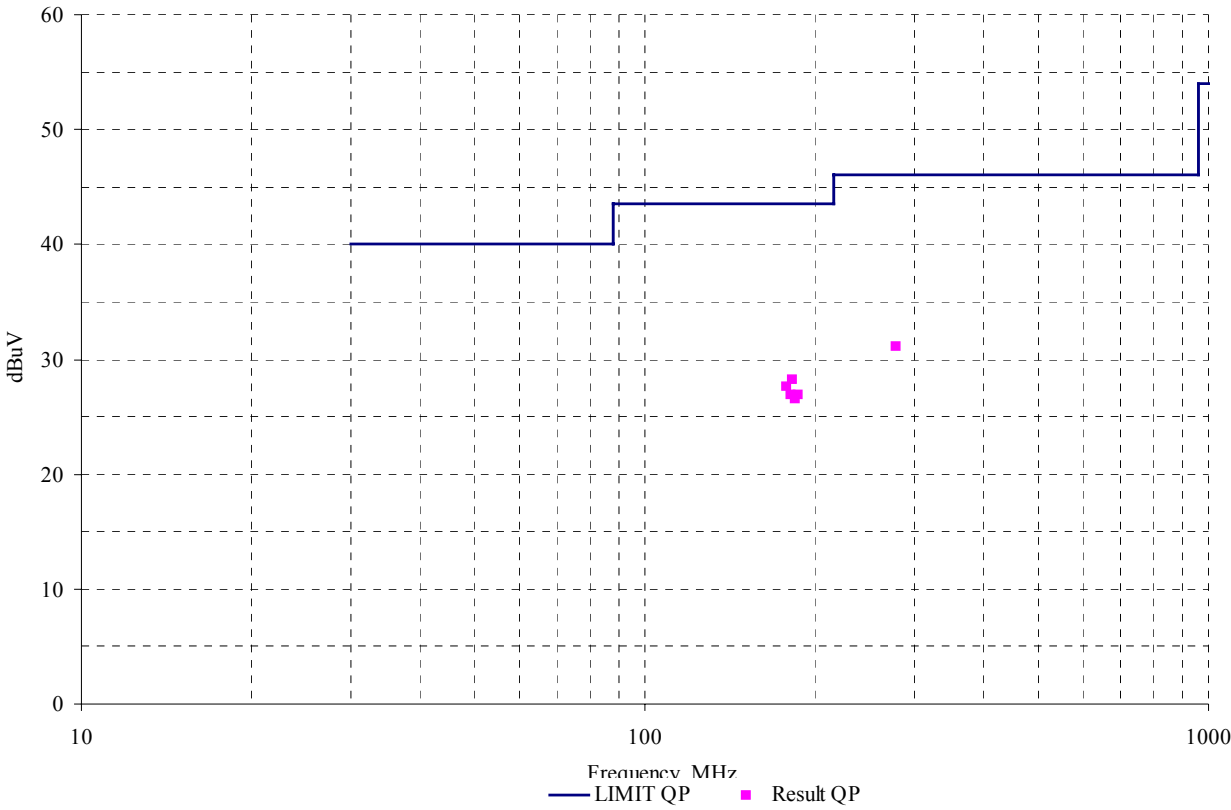


Radiation Test Data

Type : CA-T100
 Manufacturer : CM Tech Co., Ltd.
 Operation mode : REC mode
 Test distance : 3 m
 Antenna : VULB9160
 Date : Dec. 16, 2002.

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
178.5	14.3	10.9	2.4	268	267	H	27.6	43.5	15.9
181.0	14.0	10.5	2.4	241	286	H	26.9	43.5	16.6
182.6	15.6	10.1	2.4	244	300	H	28.2	43.5	15.3
184.2	14.2	10.0	2.4	315	299	H	26.6	43.5	16.9
186.3	14.8	9.6	2.5	278	314	H	26.9	43.5	16.6
279.3	16.2	11.8	3.1	220	333	H	31.1	46.0	14.9

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 : Dec. 04, 2002

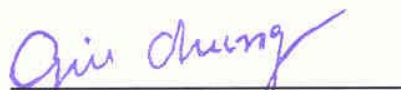
End of testing : Dec. 16, 2002

Reviewed by :



Joon H. Lee / EMC Manager
IST EMC Lab.

Approved by :



G. Chung / Chief of EMC Lab.