



EMISSION TEST REPORT

Test report file No. : **02-IST-171/FB** Date of issue : Aug. 30, 2002

Model / Type No. : N7A720 ☒ Basic ☐ Alternate

Kind of product : 17 inch Color Display Monitor

Brand name : Orion

Applicant : Orion Electric Co., Ltd.

Manufacturer : Orion Electric Co., Ltd.

License holder : Orion Electric Co., Ltd.

Address : 165 Gongdan-Dong, Gumi-City, Kyongbuk, Korea

Test result according to the regulation(s)

☒ Positive ☐ Negative

at page 3.

This test report with appendix consists of 16 pages.

The test result only responds to the tested sample.

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.

Page

Directory	<u>2</u>
Test regulations	<u>3</u>
Information of Test Laboratory	<u>3</u>
Test Conditions	<u>4 ~ 5</u>
Equipment under Test	<u>6</u>
Test Result	<u>7</u>
Test-setup	<u>8 ~ 10</u>
Summary	<u>16</u>

B) Test Data.

Conducted emissions (Mains)	: 450 kHz - 30 MHz	<u>11 ~ 13</u>
Radiated emissions	: 30 MHz – 1 GHz	<u>14 ~ 15</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.

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 :



S. J. Oh / 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 :



S. J. Oh / Research Engineer
IST EMC Lab.

EQUIPMENT UNDER TEST

Equipment Description :

Maximum Resolution :	1280 X 1024 Non –Interlaced (H-Sync: 64 kHz / V-Sync: 60 Hz)
Frequency Range :	H-Sync: 30 kHz – 70 kHz / V-sync: 50 Hz – 160Hz
CRT Picture Tube :	17 inch CDT Dynamic focus
Dot Pitch :	0.27 mm Pitch Black Matrix Screen
Power Supply Input :	100-240 Vac, 50/60 Hz
Power consumption :	85 W (max)
Port(s)/Input Connector(s) :	15-pin D-sub type signal connector
Cable(s) :	Shielded D-sub (with ferrite on both ends)
Micom Type :	S3F8647 (Maker: Motorola), Operating clock – 12 MHz
Dimensions (W x H x D) :	398 x 395 x 423 mm

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 : Scrolling “H” characters under MS Windows 98,
 Test mode : 1280 X 1024, 60 Hz (64 kHz)

Configuration of the equipment under test :

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

Equipment	Type	Brand	Serial No
PC	Brio BA600/550	HP	SG01301176
Keyboard	SK-2502C	HP	M000375059
Printer	A0302384	Northern Telecom	26633S60168
Mouse1	M-S48A	HP	LZA00850320
Mouse2	M-M28	Logitech	LCA53305547

Connecting Interface Cables :

- Unshielded AC power cable : 1.8 m
 - Shielded monitor's signal cable : 1.5 m
 - Shielded printer's signal cable : 1.8 m
-

TEST RESULT

Conducted emissions : 450 kHz - 30 MHz

The requirements are.

☒ KEPT ☐ NOT KEPT

Min. limit margin

3.0 dB at 13.679 MHz

Remarks : See test-graph to be attached at pages 11 ~ 13.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are.

☒ KEPT ☐ NOT KEPT

Min. limit margin

3.2 dB at 86.7 MHz

Remarks : See test-data at page 14 ~ 15.

TEST SETUP (Photos)

Type : N7A720



Conducted Emissions 0.15 MHz - 30 MHz



TEST SETUP (Photos)

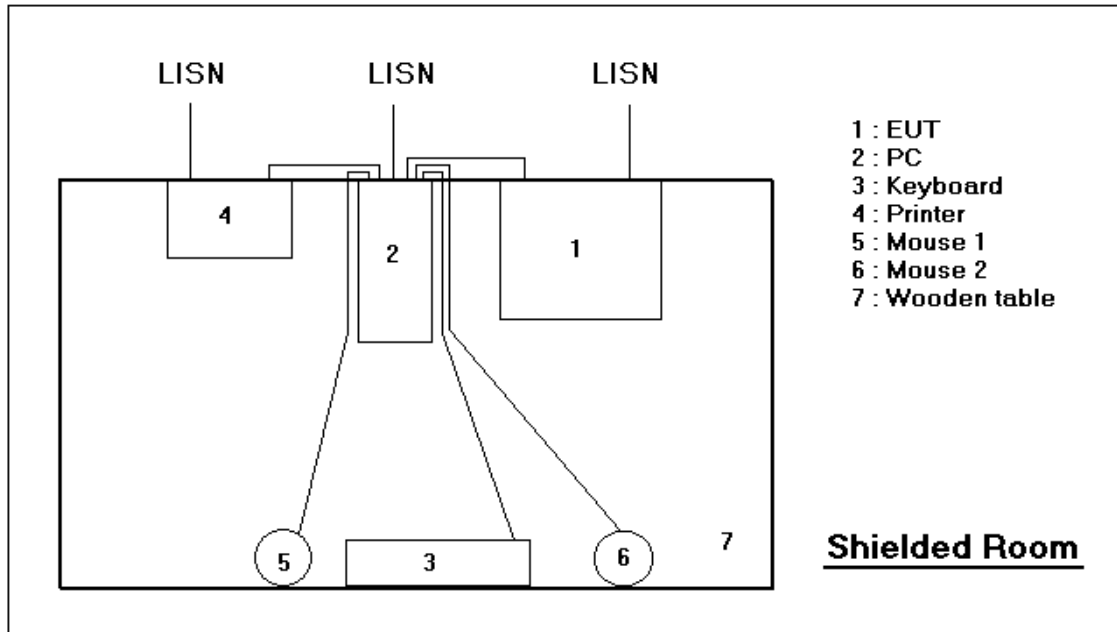
Type : N7A720



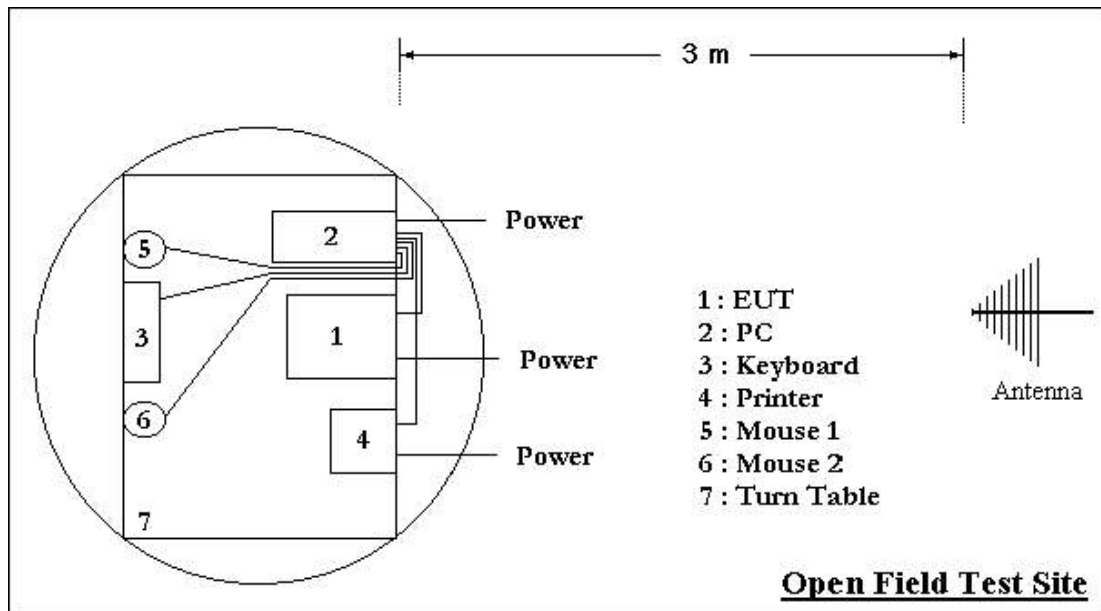
Radiated Emissions 30 MHz - 1000 MHz



TEST SETUP (Drawings)

Type : N7A720

Picture 1 : Conducted emission 450kHz ~ 30MHz



Picture 2 : Radiated emission 30MHz ~ 1000MHz

Conducted Emission Test Data

Type N7A720
 Manufacturer Orion Electric Co., Ltd.
 Operation mode Scrolling "H" pattern display 1280 x 1024, 60Hz
 Environmental Condition Temperature : 28 °C
 Humidity : 44 %
 Atmospheric pressure : 1000 mbar
 Date Aug. 26, 2002

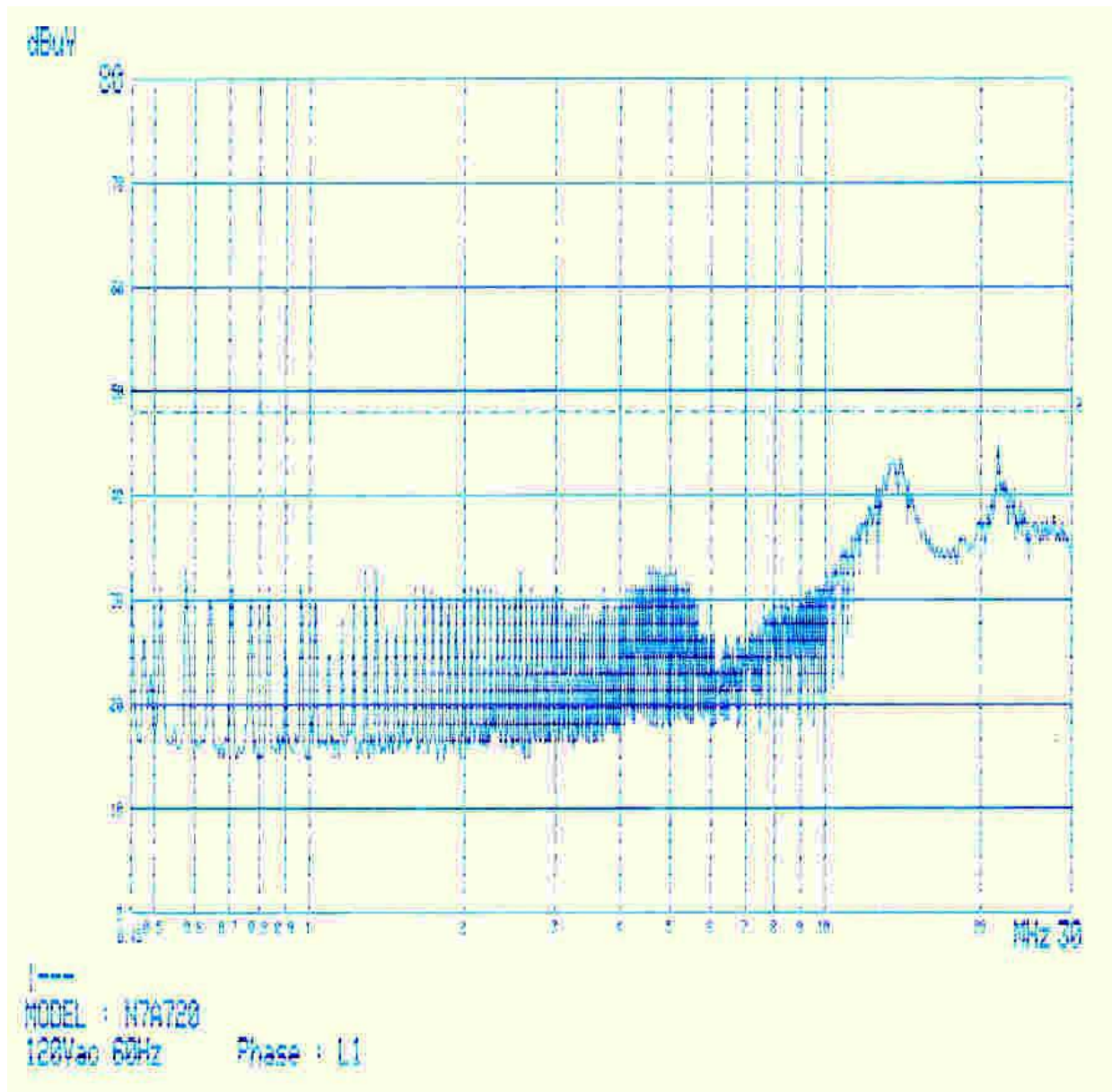
Highest Emissions relative to the limit

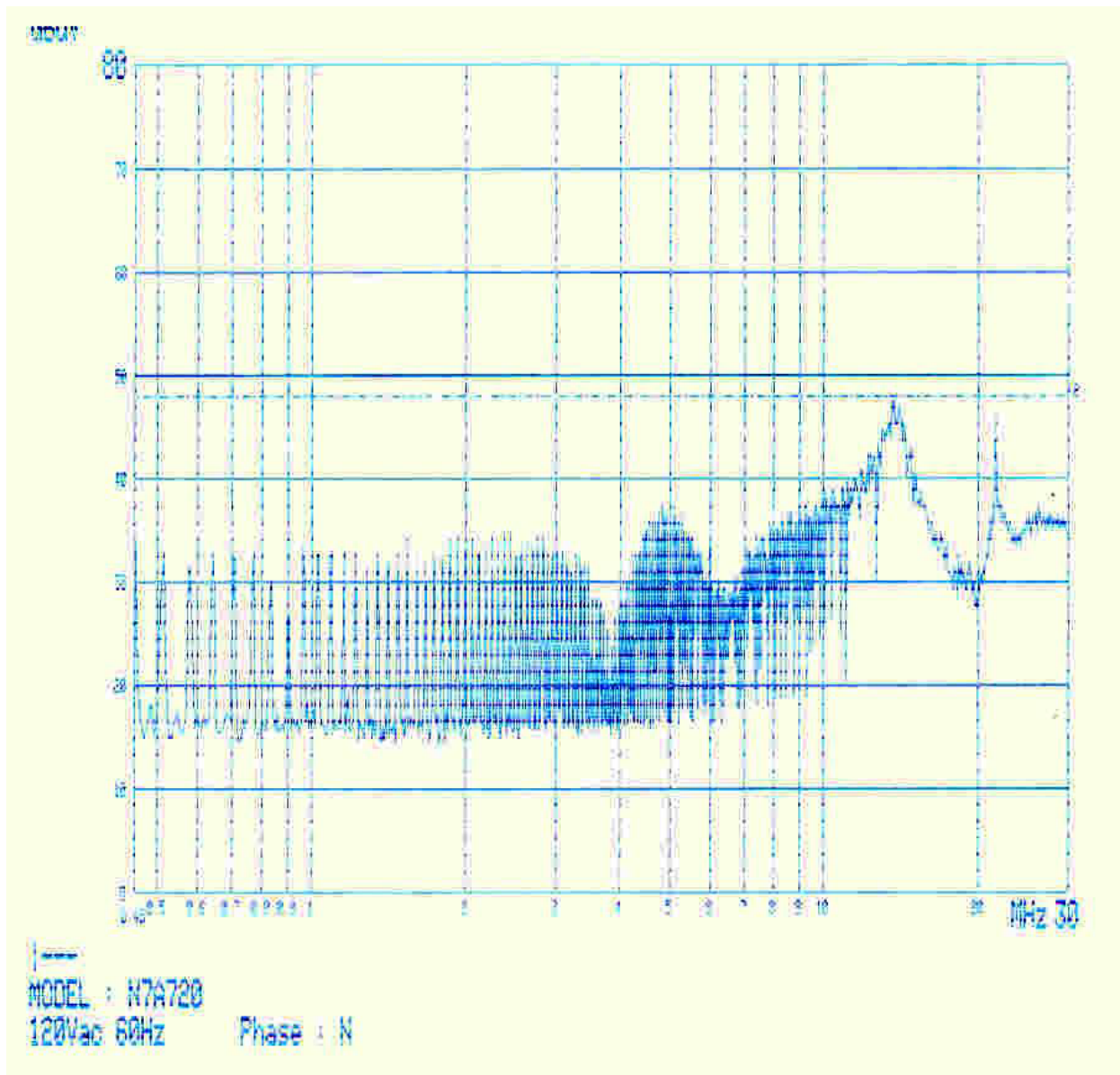
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.581	31.2	0.8	L1	32.0	48.0	16.0
1.349	31.8	0.8		32.6	48.0	15.4
4.561	31.5	0.8		32.3	48.0	15.7
13.487	41.6	0.8		42.4	48.0	5.6
14.002	41.7	0.8		42.5	48.0	5.5
21.643	43.1	0.8		43.9	48.0	4.1
2.377	33.6	0.8	N	34.4	48.0	13.6
4.818	35.4	0.8		36.2	48.0	11.8
5.012	34.9	0.8		35.7	48.0	12.3
13.679	44.2	0.8		45.0	48.0	3.0
13.747	43.2	0.8		44.0	48.0	4.0
21.645	41.4	0.8		42.2	48.0	5.8
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

*** Please refer to data graphs at page 12 ~ 13

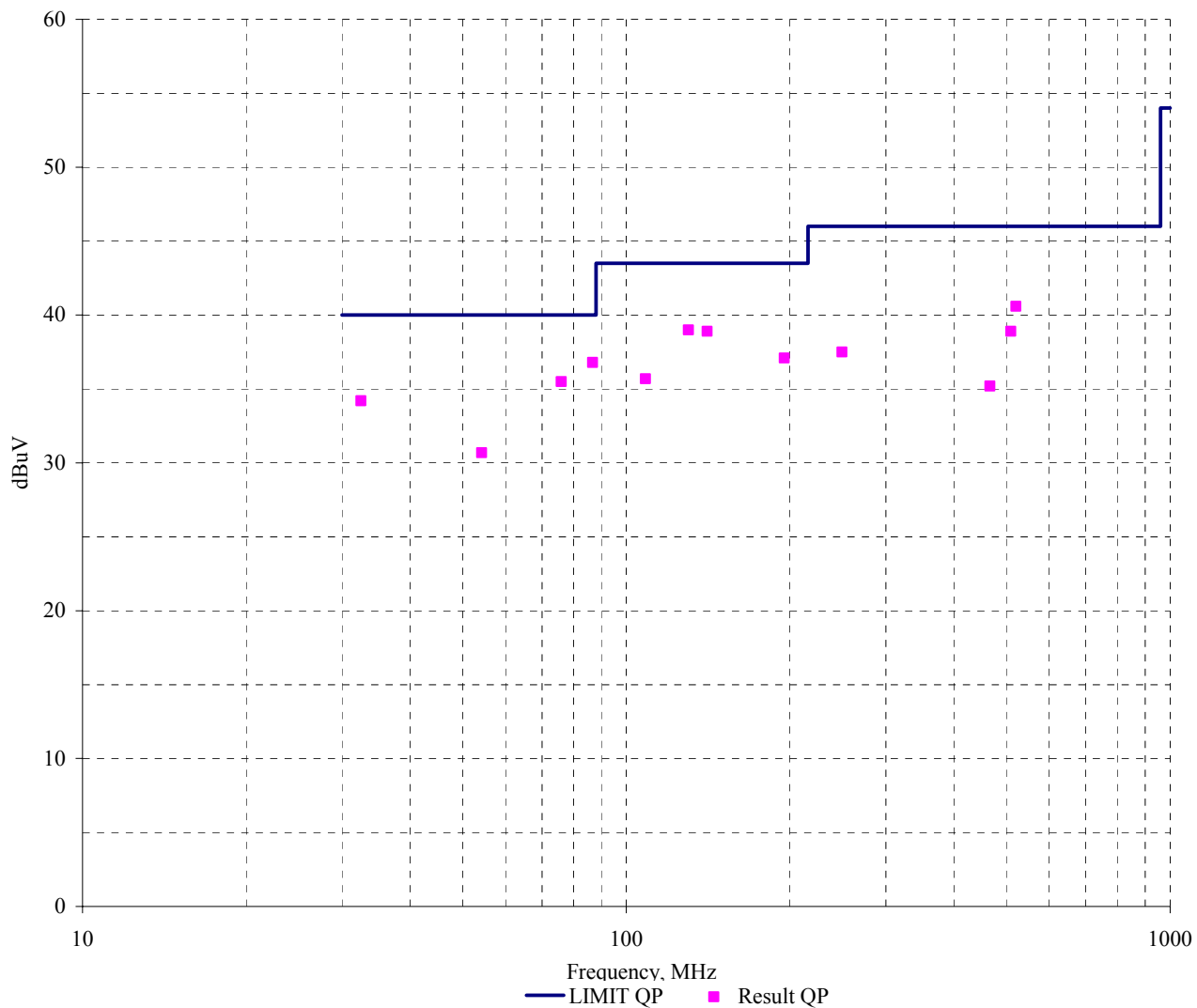




Radiation Test Data

Type N7A720
 Manufacturer Orion Electric Co., Ltd.
 Operation mode Scrolling "H" pattern display 1280 x 1024, 60Hz
 Environmental Condition Temperature : 28 °C
 Humidity : 44 %
 Atmospheric pressure : 1000 mbar
 Test distance 3 m
 Antenna VULB9160
 Date Aug. 27, 2002

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
32.5	19.8	13.4	1.0	318	100	V	34.2	40.0	5.8
54.2	18.5	10.9	1.3	62	100	V	30.7	40.0	9.3
75.9	25.2	8.7	1.6	56	294	V	35.5	40.0	4.5
86.7	27.9	7.2	1.7	33	160	V	36.8	40.0	3.2
108.4	24.7	9.1	1.9	359	163	H	35.7	43.5	7.8
130.1	26.4	10.5	2.1	100	158	V	39.0	43.5	4.5
140.9	25.1	11.6	2.2	359	156	H	38.9	43.5	4.6
195.1	25.8	8.8	2.5	270	100	H	37.1	43.5	6.4
249.3	24.0	10.7	2.8	273	100	H	37.5	46.0	8.5
466.2	16.3	14.3	4.7	276	100	V	35.3	46.0	10.7
509.5	19.0	15.1	4.8	283	132	H	38.9	46.0	7.1
520.4	20.5	15.3	4.8	359	132	H	40.6	46.0	5.4

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 : Aug. 26, 2002

End of testing : Aug. 27, 2002

Reviewed by :



Joon H, Lee. EMC Manager
Daewoo EMC Lab.

Approved by :



G, Chung. Chief of EMC Lab.