



EMISSION TEST REPORT

Test report file No. : **02-IST-199/FB** Date of issue : Oct. 02, 2002

Model / Type No. : HLM151XAR ☒ Basic ☐ Alternate

Kind of product : 15" LCD Monitor

Brand name : WOOYOUNG

Applicant : WOO YOUNG Telecom CO.,LTD.

Manufacturer : WOO YOUNG Telecom CO.,LTD.

License holder : WOO YOUNG Telecom CO.,LTD.

Address : 222-1, Suwolam-Ri, Seotan-Myum, Pyungtaek-City, Kyunggi-Do,
451-852, Korea

Test result according to the regulation(s)

☒ Positive ☐ Negative

at page 3.

This test report with appendix consists of 23 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.

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Radiated emissions	: 30 MHz – 1 GHz	<u>14 ~ 15</u> <u>21 ~ 22</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.

EQUIPMENT UNDER TEST

Equipment Description :

Resolution :	15inch XGA (1024 X 768 @60Hz)
Color display :	16,777,216 colors
Plug & Play :	DDC1/DDC2B
Power Saving :	DPMS
Power Supply Adapter :	Linearity1 Electronics Co.,Ltd. LAD6019AB4 Input 100~240VAC 1.5A 50~60Hz Output 12VDC 3A
Option :	A/V
Speaker :	Max 4W [2W X 2W]

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 : 1) Scrolling “H” characters under MS Windows 98,
 Test mode : 1024 X 768, 75 Hz
 2) Displaying color bar.

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	SG01603782
Keyboard	SK-2502C	HP	M000456678
PS/2 Mouse	M-S48A	HP	LZE01000039
Serial Mouse	M-S428	Logitech	LCA53305547
Printer	A0302384	Northern Telecom	26633S60168
Pattern Generator	PM5418	Fluke	945205418003
Connecting Interface Cables :			
- Unshielded AC power cable : 1.8 m			
- Unshielded DC power cable : 1.5 m			
- Shielded monitor's signal cable : 1.5 m			
- Shielded printer's signal cable : 1.5 m			
- Unshielded Audio cable : 1.2 m			
- Unshielded RCA cable : 1.6 m			

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 50 Ω /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.

TEST RESULT

Test Condition : Scrolling 'H' characters under MS Windows 98

Conducted emissions : 450 kHz - 30 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT
Min. limit margin 9.7 dB at 10.396 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 3.6 dB at 472.5 MHz
Remarks : See test-data at page 14 ~ 15.

Test Condition : Displaying color bar

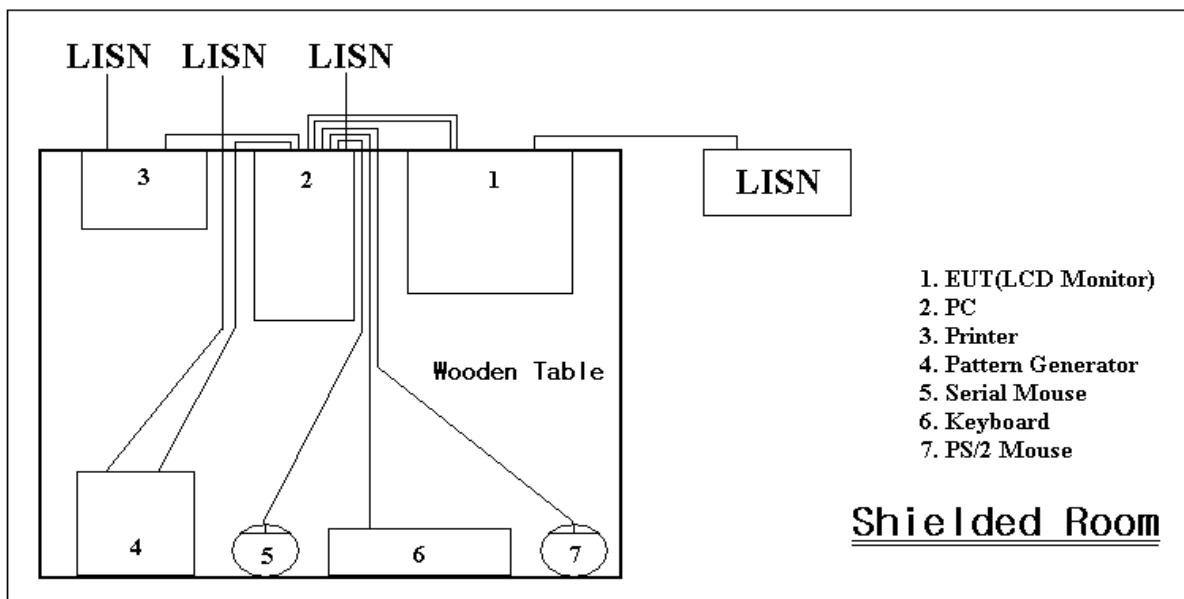
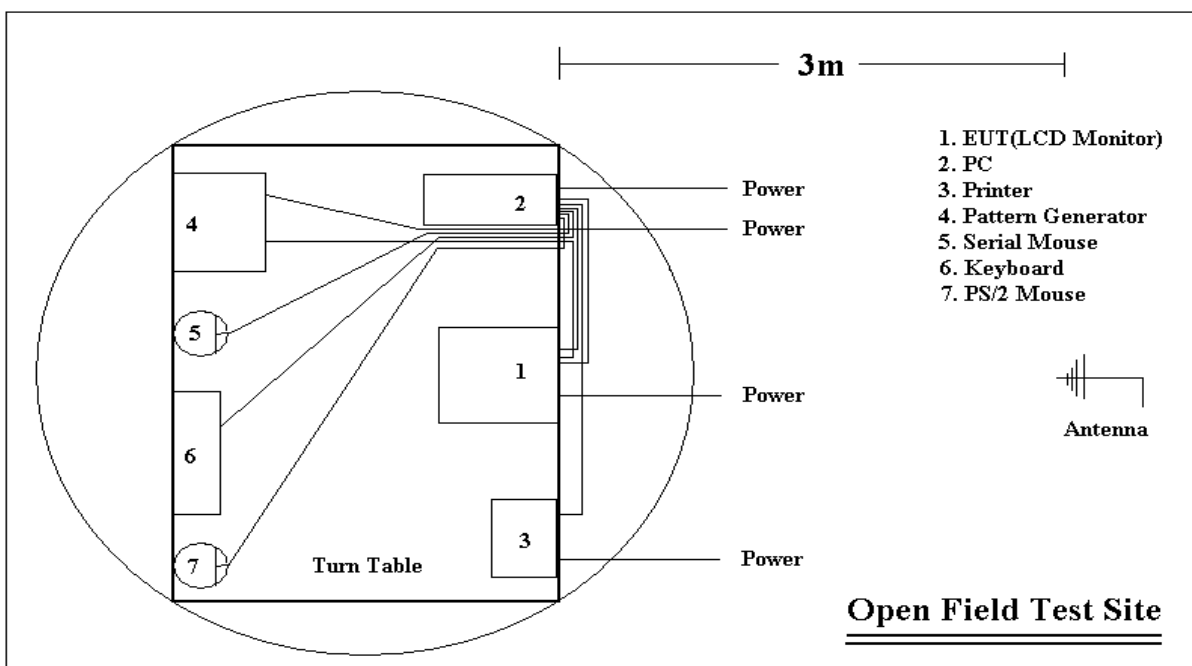
Conducted emissions : 450 kHz - 30 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT
Min. limit margin 7.9 dB at 10.195 MHz
Remarks : See test-graph to be attached at pages 18 ~ 20.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT
Min. limit margin 3.3 dB at 405.0 MHz
Remarks : See test-data at page 21 ~ 22.

TEST SETUP (Drawings)

Type : HLM151XARConducted Emissions 0.15 MHz - 30 MHzRadiated Emissions 30 MHz - 1000 MHz

TEST SETUP (Photos)

Test Condition : Scrolling 'H' characters under MS Windows 98

Type : HLM151XAR



Conducted Emissions 0.15 MHz - 30 MHz



TEST SETUP (Photos)

Test Condition : Scrolling 'H' characters under MS Windows 98

Type : HLM151XAR



Radiated Emissions 30 MHz - 1000 MHz



Conducted Emission Test Data

Type HLM151XAR
 Manufacturer WOO YOUNG Telecom CO.,LTD.
 Operation mode Scrolling "H" pattern display 1024 x 768, 75Hz
 Environmental Conditon Temperature : 23 °C
 Humidity : 41 %
 Atmospheric pressure : 1001 mbar
 Date Sep. 18, 2002

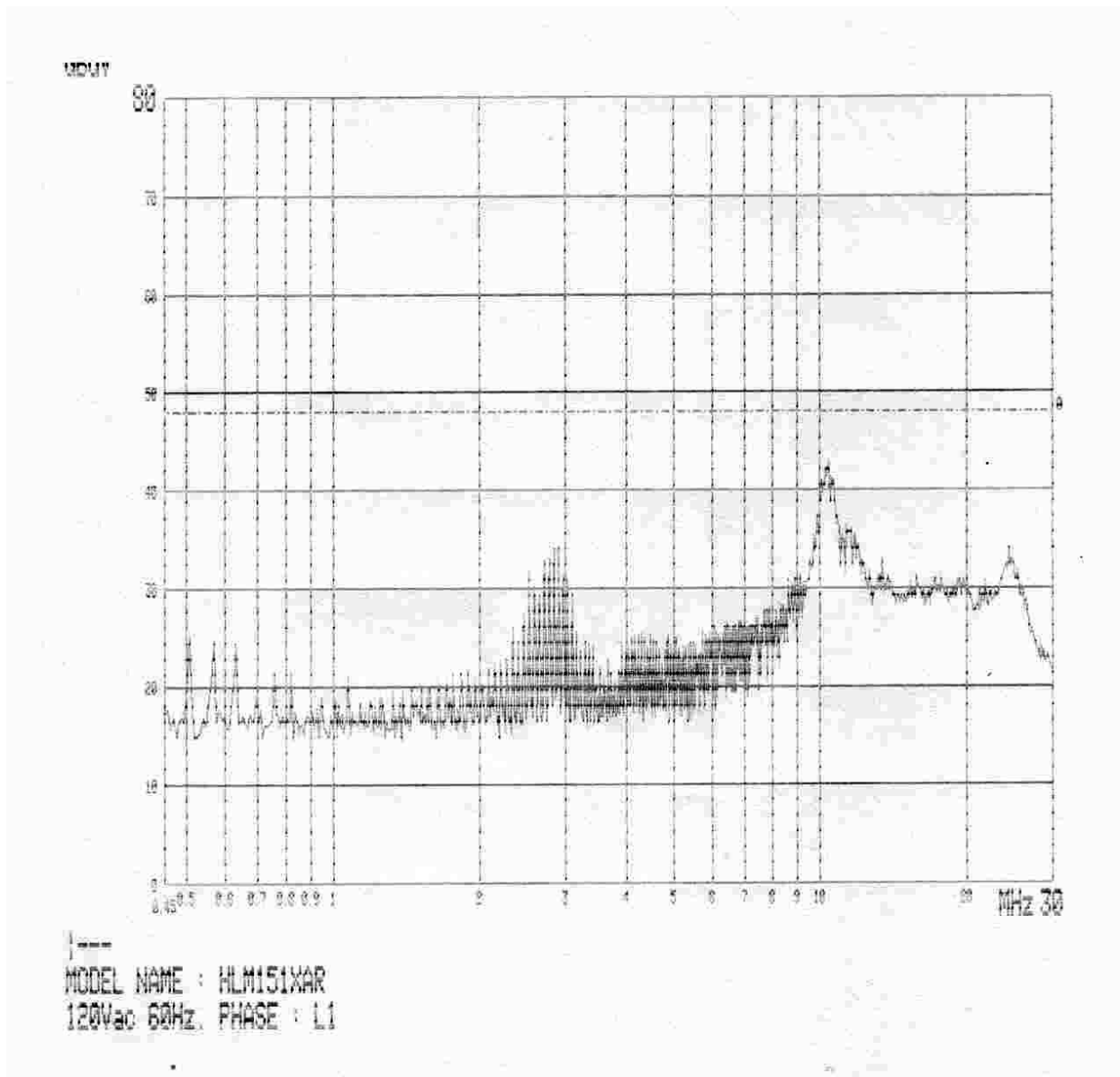
Highest Emissions relative to the limit

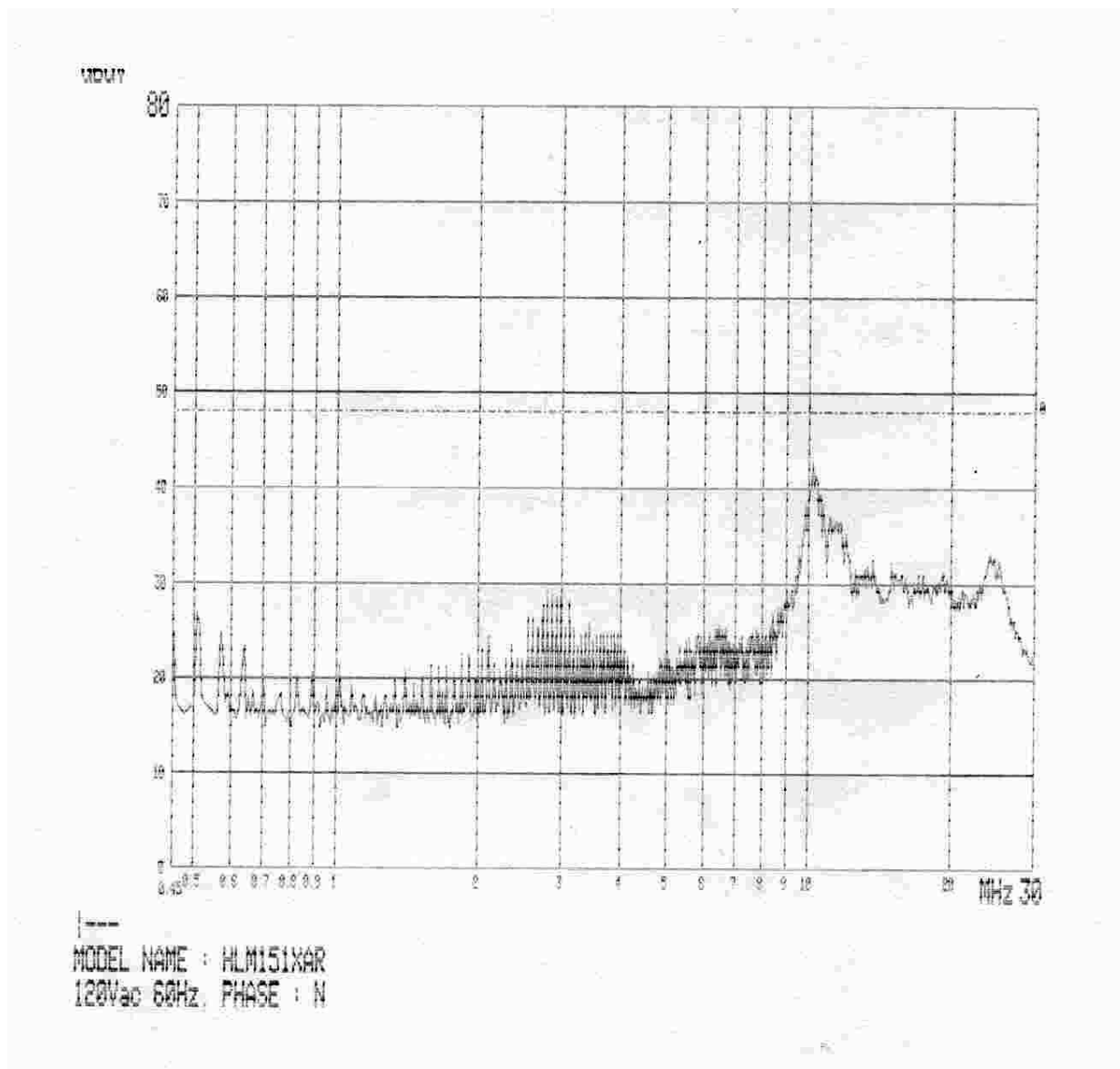
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.507	22.1	0.8	L1	22.9	48.0	25.1
1.075	14.7	0.8		15.5	48.0	32.5
2.914	31.9	0.8		32.7	48.0	15.3
6.022	21.6	0.8		22.4	48.0	25.6
10.396	37.5	0.8		38.3	48.0	9.7
24.519	27.5	0.8		28.3	48.0	19.7
0.510	23.7	0.8	N	24.5	48.0	23.5
1.019	12.4	0.8		13.2	48.0	34.8
2.808	25.2	0.8		26.0	48.0	22.0
6.507	20.1	0.8		20.9	48.0	27.1
10.157	34.0	0.8		34.8	48.0	13.2
24.121	27.6	0.8		28.4	48.0	19.6
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

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



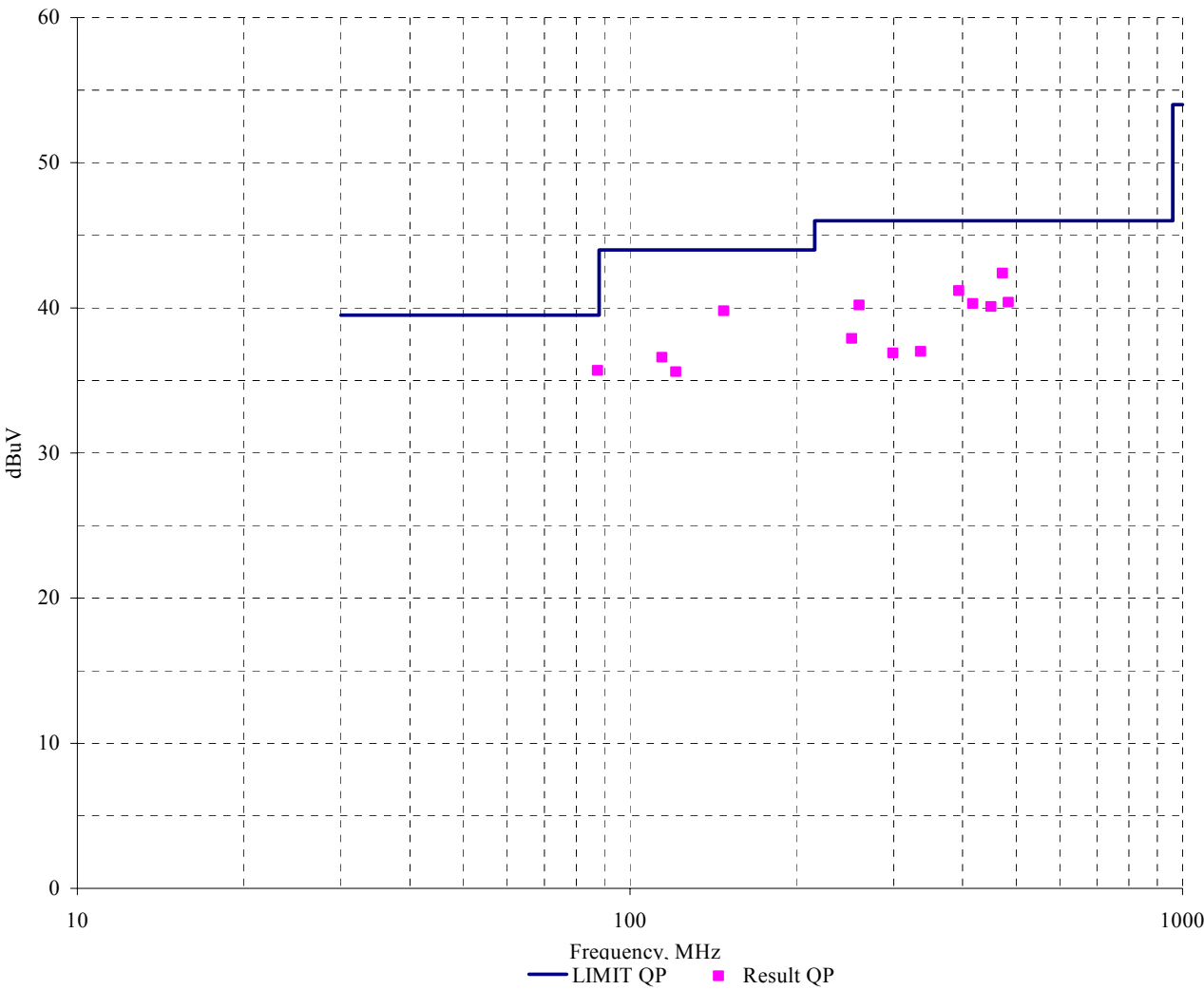


Radiation Test Data

Type HLM151XAR
 Manufacturer WOO YOUNG Telecom CO.,LTD.
 Operation mode Scrolling "H" pattern display 1024 x 768, 75Hz
 Environmental Conditon Temperature : 26 °C
 Humidity : 43 %
 Atmospheric pressure : 1002 mbar
 Test distance 3 m
 Antenna VULB9160
 Date Sep. 26, 2002

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
87.4	26.8	7.2	1.7	360	190	V	35.7	40.0	4.3
114.3	25.1	9.6	1.9	284	195	H	36.6	43.5	6.9
121.0	23.7	9.9	2.0	280	170	H	35.6	43.5	7.9
147.8	25.5	12.0	2.3	287	189	H	39.8	43.5	3.7
252.0	24.3	10.8	2.8	326	145	H	37.9	46.0	8.1
259.9	26.1	11.2	2.9	335	145	H	40.2	46.0	5.8
299.3	22.0	11.7	3.2	348	145	V	36.9	46.0	9.1
336.0	21.8	11.7	3.5	360	193	V	37.0	46.0	9.0
393.7	24.2	12.9	4.1	335	279	H	41.2	46.0	4.8
417.4	22.4	13.5	4.4	193	251	H	40.3	46.0	5.7
450.3	21.6	14.0	4.5	296	230	H	40.1	46.0	5.9
472.5	23.4	14.3	4.7	223	198	V	42.4	46.0	3.6
483.9	21.0	14.6	4.8	215	216	V	40.4	46.0	5.7

MEASUREMENT OF DISTURBANCE RADIATION



TEST SETUP (Photos)

Test Condition : Displaying color bar

Type : HLM151XAR



Conducted Emissions 0.15 MHz - 30 MHz



TEST SETUP (Photos)

Test Condition : Displaying color bar

Type : HLM151XAR



Radiated Emissions 30 MHz - 1000 MHz



Conducted Emission Test Data

Type HLM151XAR
 Manufacturer WOO YOUNG Telecom CO.,LTD.
 Operation mode Displaying color bar
 Environmental Conditon Temperature : 23 °C
 Humidity : 41 %
 Atmospheric pressure : 1001 mbar
 Date Sep. 18, 2002

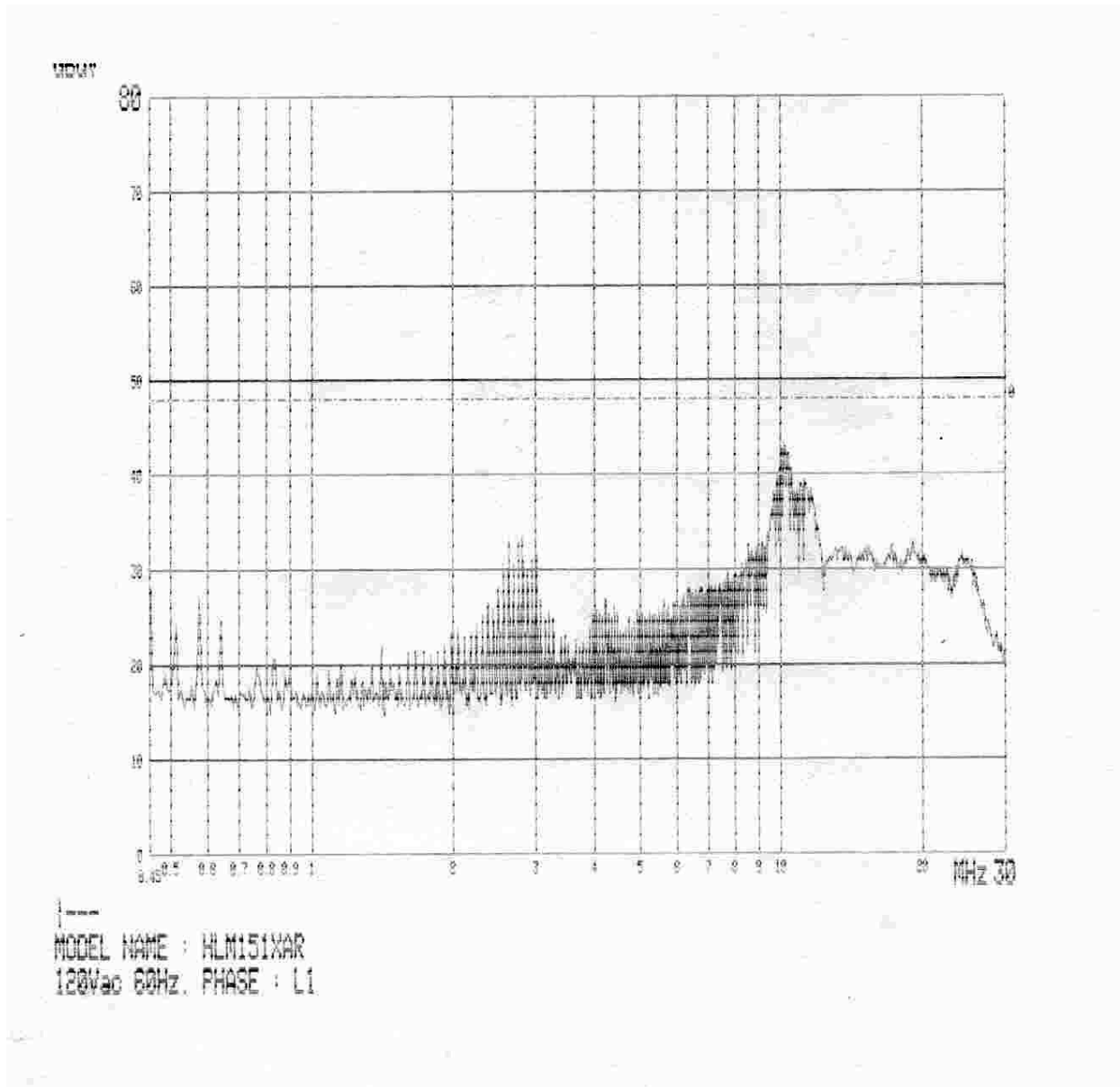
Highest Emissions relative to the limit

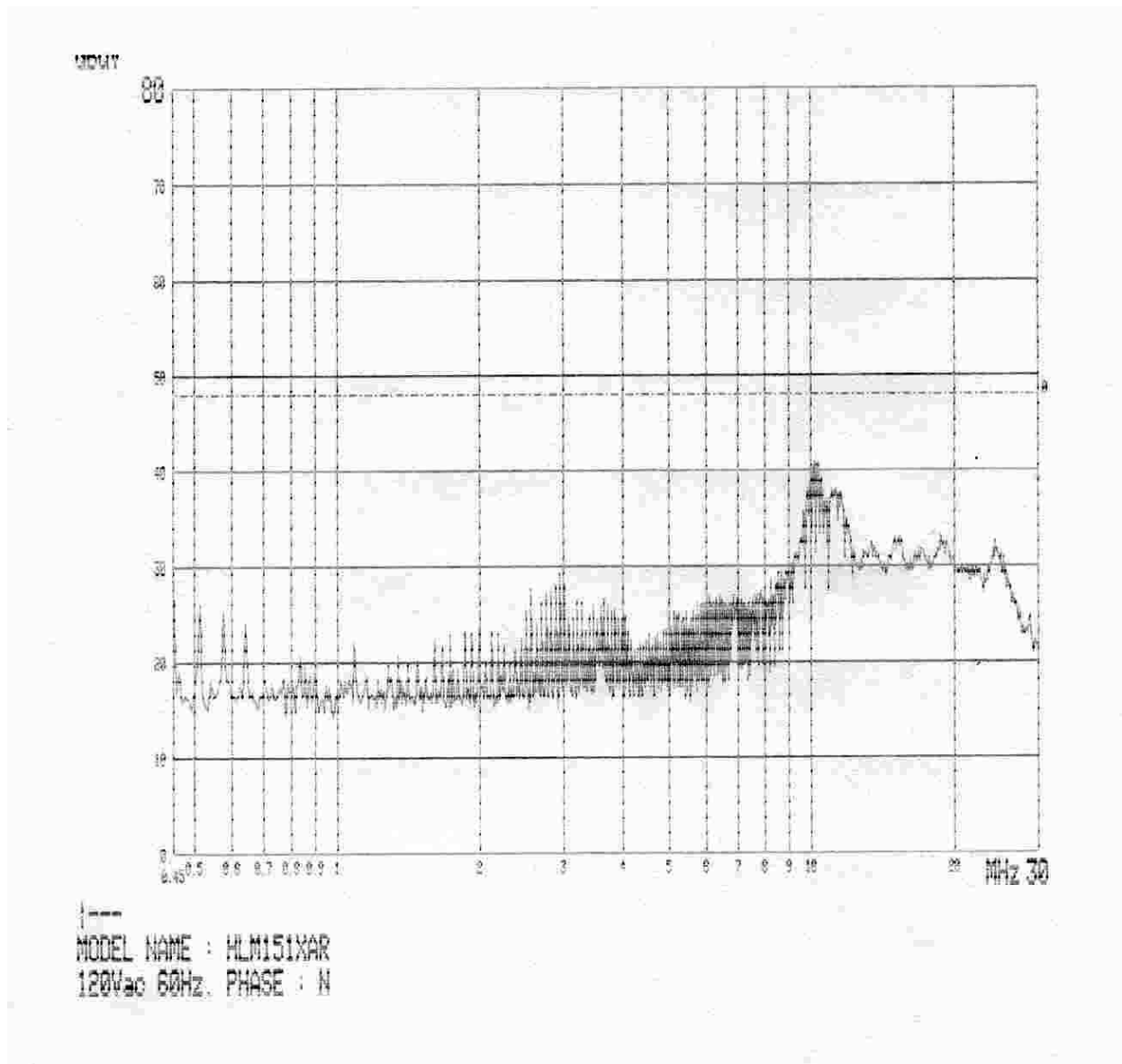
Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.450	29.2	0.8	L1	30.0	48.0	18.0
0.577	23.6	0.8		24.4	48.0	23.6
2.629	28.5	0.8		29.3	48.0	18.7
4.231	22.9	0.8		23.7	48.0	24.3
10.195	39.3	0.8		40.1	48.0	7.9
19.108	28.0	0.8		28.8	48.0	19.2
0.450	25.4	0.8	N	26.2	48.0	21.8
1.092	15.2	0.8		16.0	48.0	32.0
2.952	26.0	0.8		26.8	48.0	21.2
6.098	22.5	0.8		23.3	48.0	24.7
10.207	37.9	0.8		38.7	48.0	9.3
18.748	28.1	0.8		28.9	48.0	19.1
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

*** Please refer to data graphs at page 19 ~ 20.



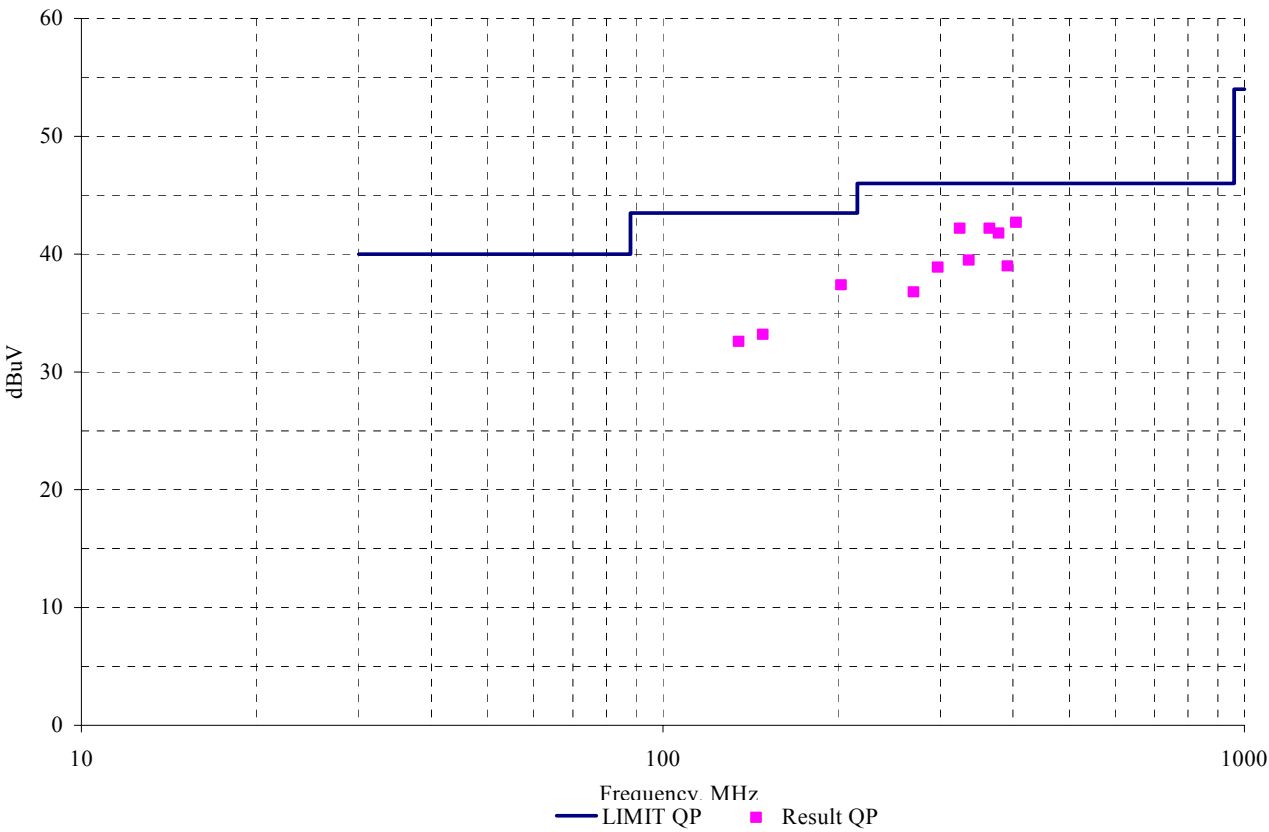


Radiation Test Data

Type	HLM151XAR
Manufacturer	WOO YOUNG Telecom CO.,LTD.
Operation mode	Displaying color bar
Environmental Condition	Temperature : 26 °C Humidity : 43 % Atmospheric pressure : 1001 mbar
Test distance	3 m
Antenna	VULB9160
Date	Sep. 26, 2002

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
135.0	19.5	11.0	2.1	21	100	V	32.6	43.5	10.9
148.5	18.9	12.0	2.3	223	100	V	33.2	43.5	10.3
202.5	26.4	8.5	2.5	24	100	V	37.4	43.5	6.1
270.0	22.2	11.6	3.0	130	100	V	36.8	46.0	9.2
297.0	24.0	11.7	3.2	275	145	V	38.9	46.0	7.1
324.0	27.1	11.7	3.4	266	196	V	42.2	46.0	3.8
335.9	24.3	11.7	3.5	164	100	V	39.5	46.0	6.5
364.5	26.4	12.1	3.7	110	212	H	42.2	46.0	3.8
378.0	25.5	12.5	3.8	164	100	V	41.8	46.0	4.2
391.5	22.0	12.9	4.1	153	189	V	39.0	46.0	7.0
405.0	25.1	13.3	4.3	222	192	H	42.7	46.0	3.3

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 A 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 : Sep. 16, 2002

End of testing : Sep. 28, 2002

Reviewed by :



Joon H. Lee. EMC Manager
Daewoo EMC Lab.

Approved by :



G, Chung. Chief of EMC Lab.