IST EMC LAB.

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

Test report file No. : **02-IST-061/FA** Date of issue : Apr. 04, 2002

Model / Type No. : HLM170M □ Basic ■ Alternate

Kind of product : LCD Monitor

Brand name : Han Gil Telecom

Applicant : Han Gil Telecom Co., Ltd.

Address : 222-1, Suwolam-Ri, Seotan-Myun, Pyungtak-Si, Kyungki-Do, Korea

Manufacturer : Han Gil Telecom Co., Ltd.

Address : 222-1, Suwolam-Ri, Seotan-Myun, Pyungtak-Si, Kyungki-Do, Korea

License holder : Han Gil Telecom Co., Ltd.

Test result according to the regulation(s)

■ Positive ☐ Negative

at page 3.

This 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 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.

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DIRECTORY

A) Documentation.

B) Test Data.

C) Appendix

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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.
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EQUIPMENT UNDER TEST

Equipment Description :

LCD Pannel :	17.0 inch TFT LCD Pixel Pinch 0.264(H) x 0.264(V) mm
Frequency Range :	Vertical 56 ~ 75 Hz, Horizontal 31.5 ~ 80 kHz
List Of Each OSC. Or CRY. Freq.(Freq.>=1MHz) :	12.0 MHz, 14.318 MHz On The Main Board.
External Connectors :	Analog RGB Video Port, DVI Port, Speaker Input, Headphone Input, DC Input, VCR Input, S-Video Input, Audio R-L, Line Out, Antenna Input.
Display Resolution :	Maximum : 1280 x 1024, 75Hz Basic : 1280 x 1024, 60Hz
Power Supply Input :	Input:100 ~ 240 Vac, 50/60 Hz, 1.5A. Output: 12Vdc, 4.16A.
Power consumption :	40 W

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 (60 kHz)
2) Speak : Activating Speaker(Sound Play Mode)

Configuration of the equipment under test :

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

Equipment	Type	Brand	Serial No.
PC 1	Brio BA600/550	HP	SG02104823
Keyboard 1	SK-2502C	HP	M000456712
Mouse 1	M-S48A	HP	LZE01000092
PC 2	HP Pavilion 8821	HP	KR11015100
Keyboard 2	5181	GOODNICE	BM10206995
Mouse 2	M-S48a	LZE10251257	Logitech
Pattern Generator	PM5515	PHLIPS	L03724

Connecting Interface Cables :
- Unshielded AC power cable : 1.8 m
- Unshielded Speak cable : 1.0 m
- Shielded monitor's signal cable(RGB Video Port) : 1.5 m
- Shielded monitor's signal cable(DVI Port) : 1.8 m
- Shielded printer's signal cable : 1.5 m

Remark :
- PC1 for Analog Display Mode(RGB Video Port)
- PC2 for Digital Display Mode(DVI Port)

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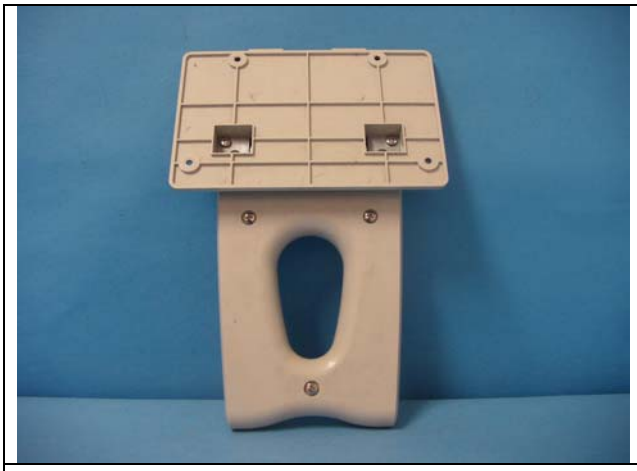
Description of Difference

(Differ Between Original and Changed HLM170M)

1. Shape of Stand and Adapter

	
Original HLM170M Stand	Changed HLM170M Stand

2. Adapter Type

	Type	Brand	Serial No.
Original HLM170M	LSE9901B1250	LI SHIN INTERNATIONAL ENTERPRISE CORP.	C0129604384
Changed HLM170M	LAD6019AB4	LINEARITY 1 ELECTRONICS CO., LTD.	N/A

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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	Jun. 16, 2001	861742/015
3725/2	LISN	EMCO	Jul. 30, 2001	9101-2068
KNW-407	LISN	Hyup-Rip	Jul. 26, 2001	8-883-10
ESH 3-Z2	Pulse Limiter	Rohde & Schwarz	Jul. 13, 2001	357.8810.52

Test - accessories :

Type	Manufacturer
Aneroid Barometer	Sato
Hygrometer	Sato

Measurement Procedures :

Conducted emissions measurments 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.

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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	Jun. 12, 2001	861744/018
VULB 9160	Antenna	Schwarzbeck	Jun. 04, 2001	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.

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TEST RESULT

Test Condition : Analog Display Mode

Conducted emissions : 450 kHz - 30 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT

Min. limit margin 6.7 dB at 3.924 MHz

Remarks : See test-graph to be attached at pages 12 ~ 14.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT

Min. limit margin 4.0 dB at 112.0 MHz

Remarks : See test-data at page 15 ~ 16.

Test Condition : Digital Display Mode

Conducted emissions : 450 kHz - 30 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT

Min. limit margin 6.7 dB at 4.028 MHz

Remarks : See test-graph to be attached at pages 17 ~ 19.

Radiated emissions (electric field) 30 MHz - 1000 MHz

The requirements are. ☒ KEPT ☐ NOT KEPT

Min. limit margin 4.8 dB at 279.9 MHz

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

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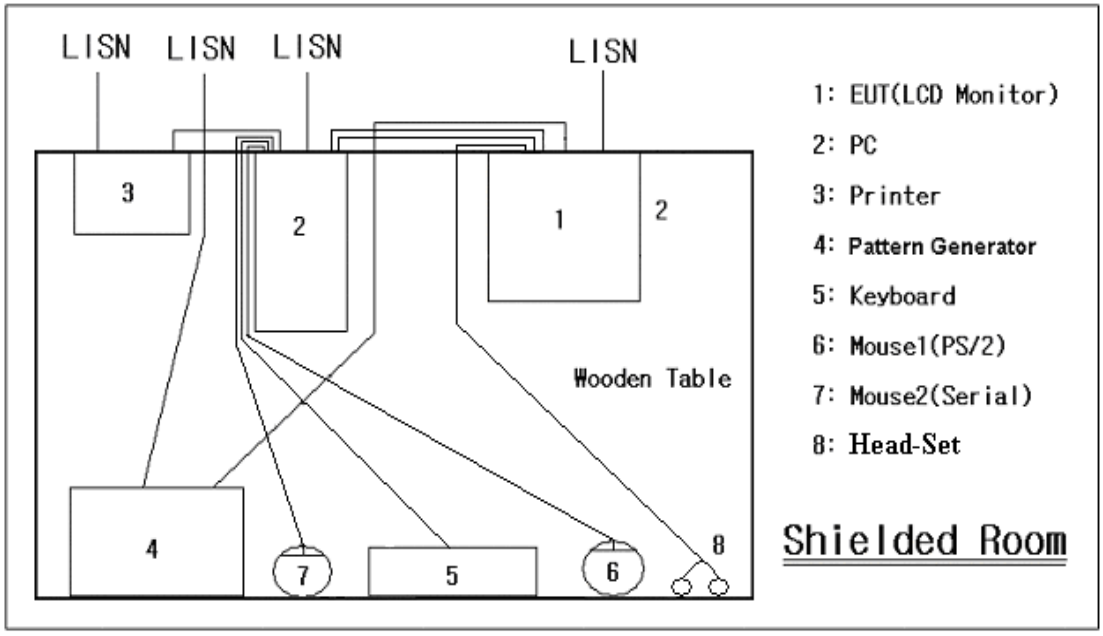
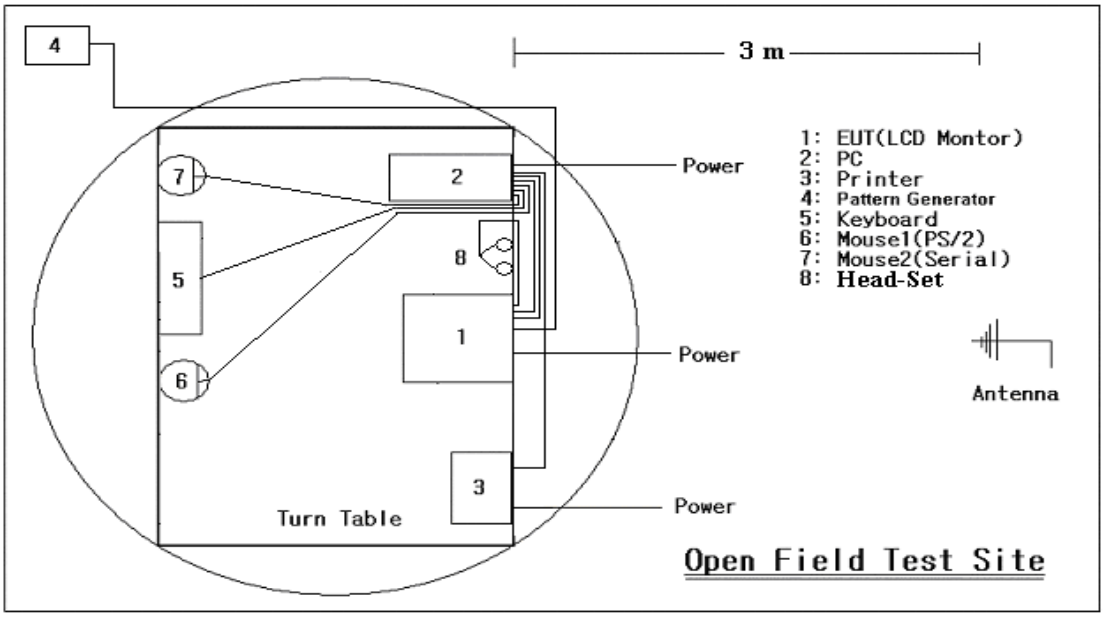
TEST SETUP (Drawings)

Type : HLM170M



Conducted Emissions 0.15 MHz - 30 MHz



Radiated Emissions 30 MHz - 1000 MHz

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TEST SETUP (Photos)

Type : HLM170M

Conducted Emissions 0.15 MHz - 30 MHz

IST EMC Lab. San 21-8 Goan-Ri, Baekam-Myun, Yongin-Si, Kyunggi-Do, KOREA
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TEST SETUP (Photos)

Type : HLM170M

Radiated Emissions 30 MHz - 1000 MHz

IST EMC Lab. San 21-8 Goan-Ri, Baekam-Myun, Yongin-Si, Kyunggi-Do, KOREA
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Conducted Emission Test Data

Test Condition : Analog Display Mode

Type	HLM170M	
Manufacturer	Han Gil Telecom Co., Ltd.	
Operation mode	Scrolling "H" pattern display 1280 x 1024, 75Hz	
	Sound Play Mode	
Environmental Conditon	Temperature	: 17 °C
	Humidity	: 43 %
	Atmospheric pressure	: 1001 mbar
Date	Mar. 11, 2002	

Highest Emissions ralative to the limit

Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.605	36.2	0.8	L1	37.0	48.0	11.0
1.160	35.8	0.8		36.6	48.0	11.4
1.967	37.1	0.8		37.9	48.0	10.1
3.986	40.2	0.8		41.0	48.0	7.0
5.552	34.9	0.8		35.7	48.0	12.3
16.858	30.8	0.8		31.6	48.0	16.4
0.503	33.4	0.8	N	34.2	48.0	13.8
1.710	35.6	0.8		36.4	48.0	11.6
2.263	37.2	0.8		38.0	48.0	10.0
3.924	40.5	0.8		41.3	48.0	6.7
5.386	35.9	0.8		36.7	48.0	11.3
7.550	32.6	0.8		33.4	48.0	14.6
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

*** **Please refer to data graphs at page 13 ~ 14.**

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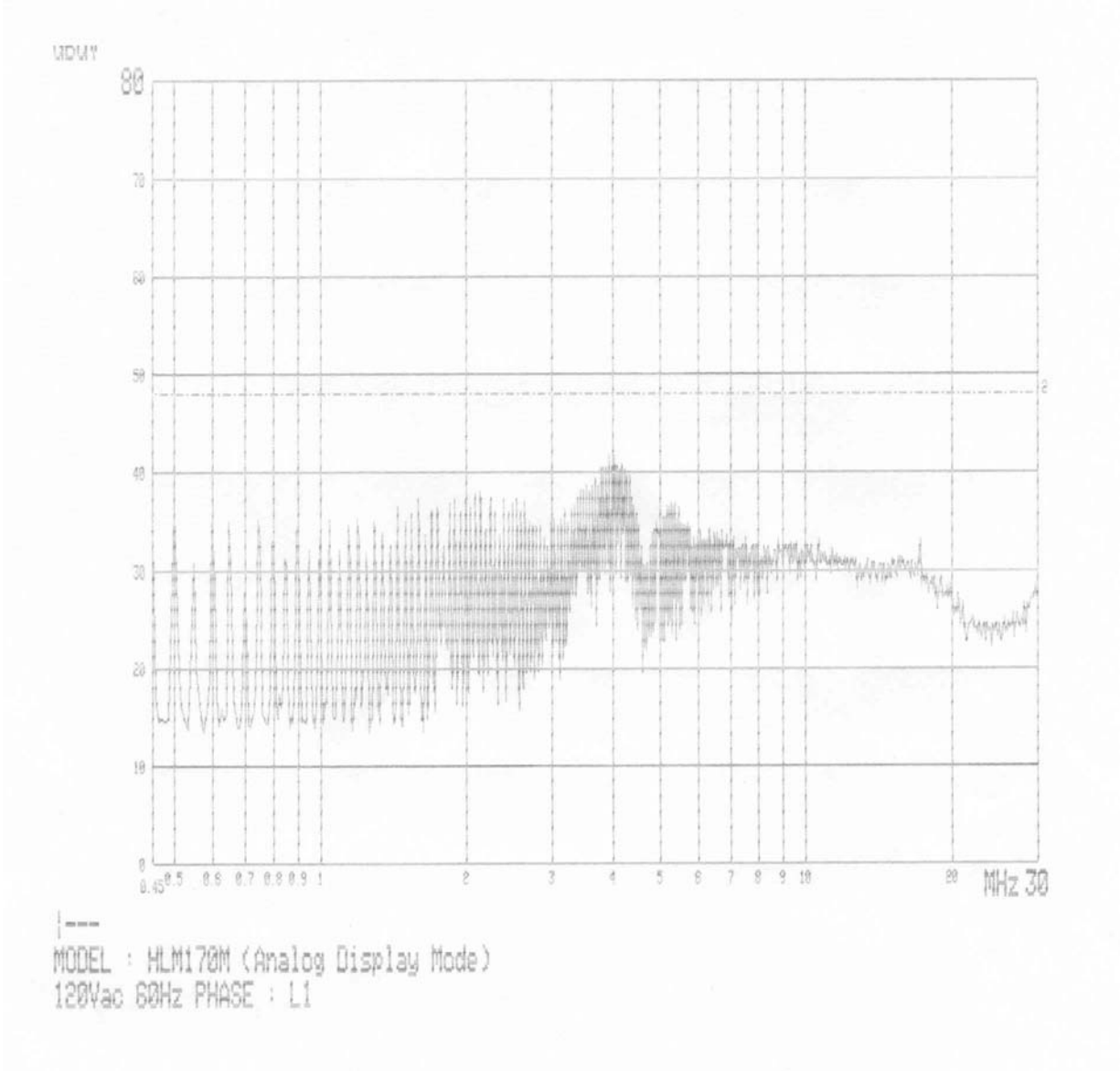

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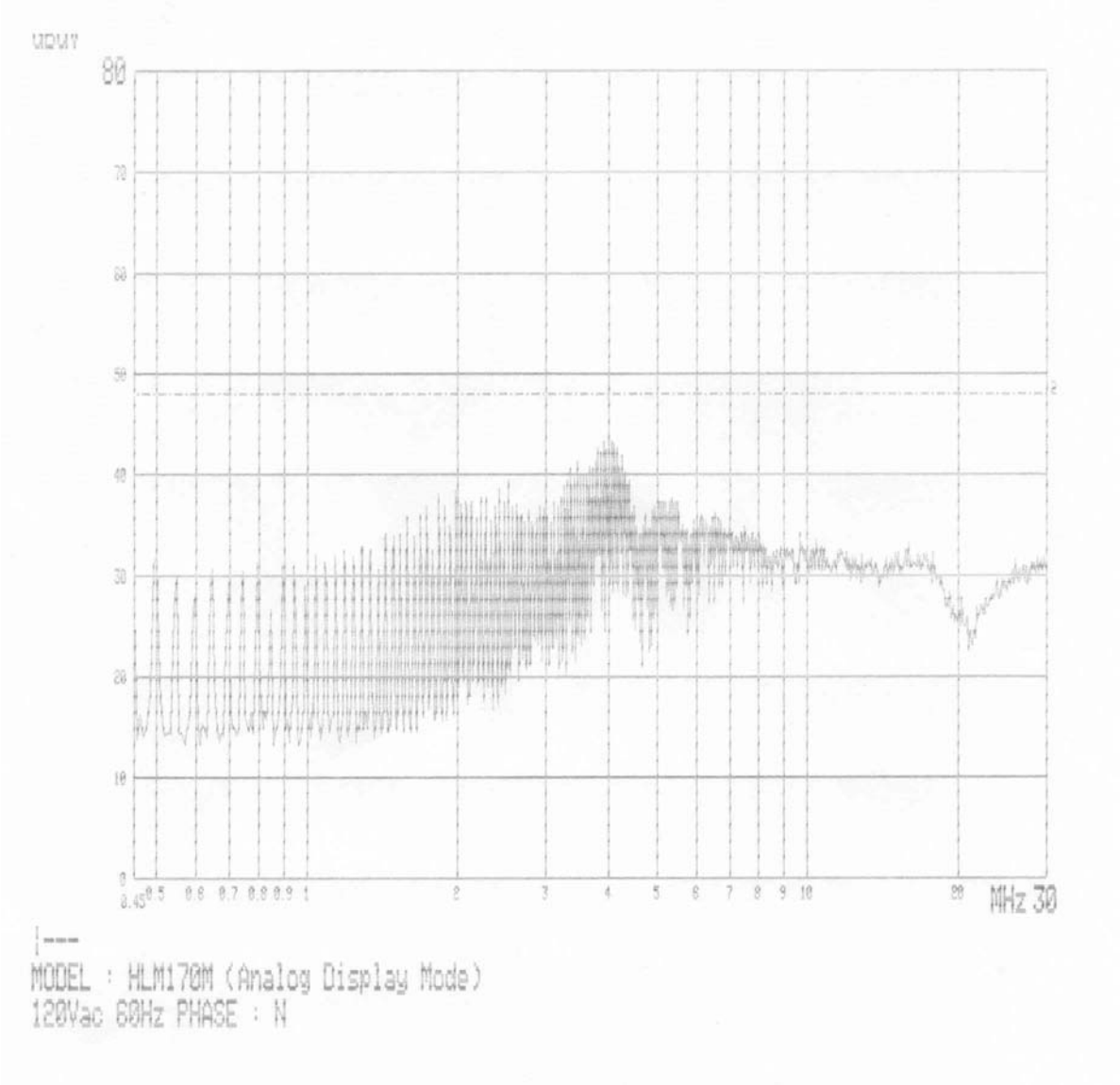

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Radiation Test Data

Test Condition : Analog Display Mode

Type	HLM170M
Manufacturer	Han Gil Telecom Co., Ltd.
Operation mode	Scrolling "H" pattern display 1280 x 1024, 75Hz Sound Play Mode
Environmental Conditon	Temperature : 17 °C Humidity : 42 % Atmospheric pressure : 1001 mbar
Test distance	3 m
Antenna	VULB9160
Date	Mar. 14, 2002

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
33.4	19.8	13.4	1.0	273	100	V	34.2	40.0	5.8
82.8	18.0	7.5	1.6	260	100	V	27.1	40.0	12.9
112.0	28.2	9.4	1.9	103	100	V	39.5	43.5	4.0
134.5	15.9	10.9	2.1	130	100	V	28.9	43.5	14.6
145.4	17.7	11.9	2.3	256	100	V	31.8	43.5	11.6
223.9	28.1	8.8	2.8	183	258	H	39.7	46.0	6.3
257.3	23.9	11.1	2.9	264	260	H	37.8	46.0	8.1
274.2	15.2	11.7	3.0	21	100	V	29.9	46.0	16.1
330.2	22.3	11.7	3.4	298	100	V	37.4	46.0	8.6
341.5	21.8	11.7	3.5	321	100	V	37.0	46.0	9.0
391.8	22.7	12.9	4.1	69	189	H	39.7	46.0	6.3
447.8	19.9	13.9	4.5	47	176	H	38.3	46.0	7.7

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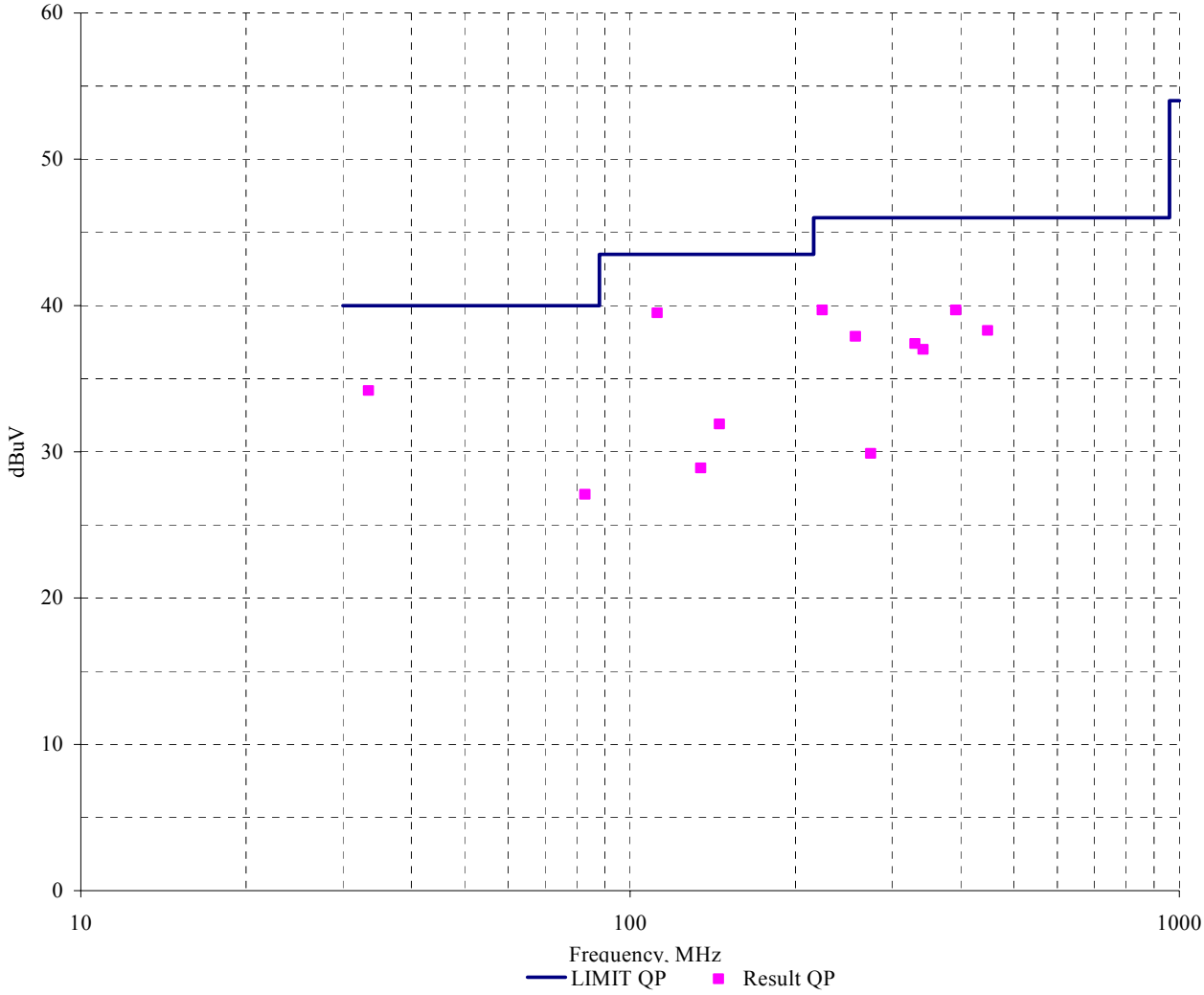
MEASUREMENT OF DISTURBANCE RADIATION



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Conducted Emission Test Data

Test Condition : Digital Display Mode

Type	HLM170M	
Manufacturer	Han Gil Telecom Co., Ltd.	
Operation mode	Scrolling "H" pattern display 1280 x 1024, 75Hz	
	Sound Play Mode	
Environmental Conditon	Temperature	: 17 °C
	Humidity	: 43 %
	Atmospheric pressure	: 1001 mbar
Date	Mar. 11, 2002	

Highest Emissions ralative to the limit

Frequency [MHz]	Reading [dBμV]	Insertion loss [dB]	Phase (L1/N)	Result [dBμV]	Limit [dBμV]	Margin [dB]
0.500	36.8	0.8	L1	37.6	48.0	10.4
0.900	35.3	0.8		36.1	48.0	11.9
2.256	36.6	0.8		37.4	48.0	10.6
3.961	40.3	0.8		41.1	48.0	6.9
5.267	35.0	0.8		35.8	48.0	12.2
17.660	28.6	0.8		29.4	48.0	18.6
0.504	32.5	0.8	N	33.3	48.0	14.7
0.907	31.5	0.8		32.3	48.0	15.7
2.014	37.3	0.8		38.1	48.0	9.9
4.028	40.5	0.8		41.3	48.0	6.7
5.490	36.1	0.8		36.9	48.0	11.1
17.381	29.5	0.8		30.3	48.0	17.7
Cable loss are less than 0.1 dB						

*L1 : Live Line

**N : Neutral Line

*** **Please refer to data graphs at page 18 ~ 19.**

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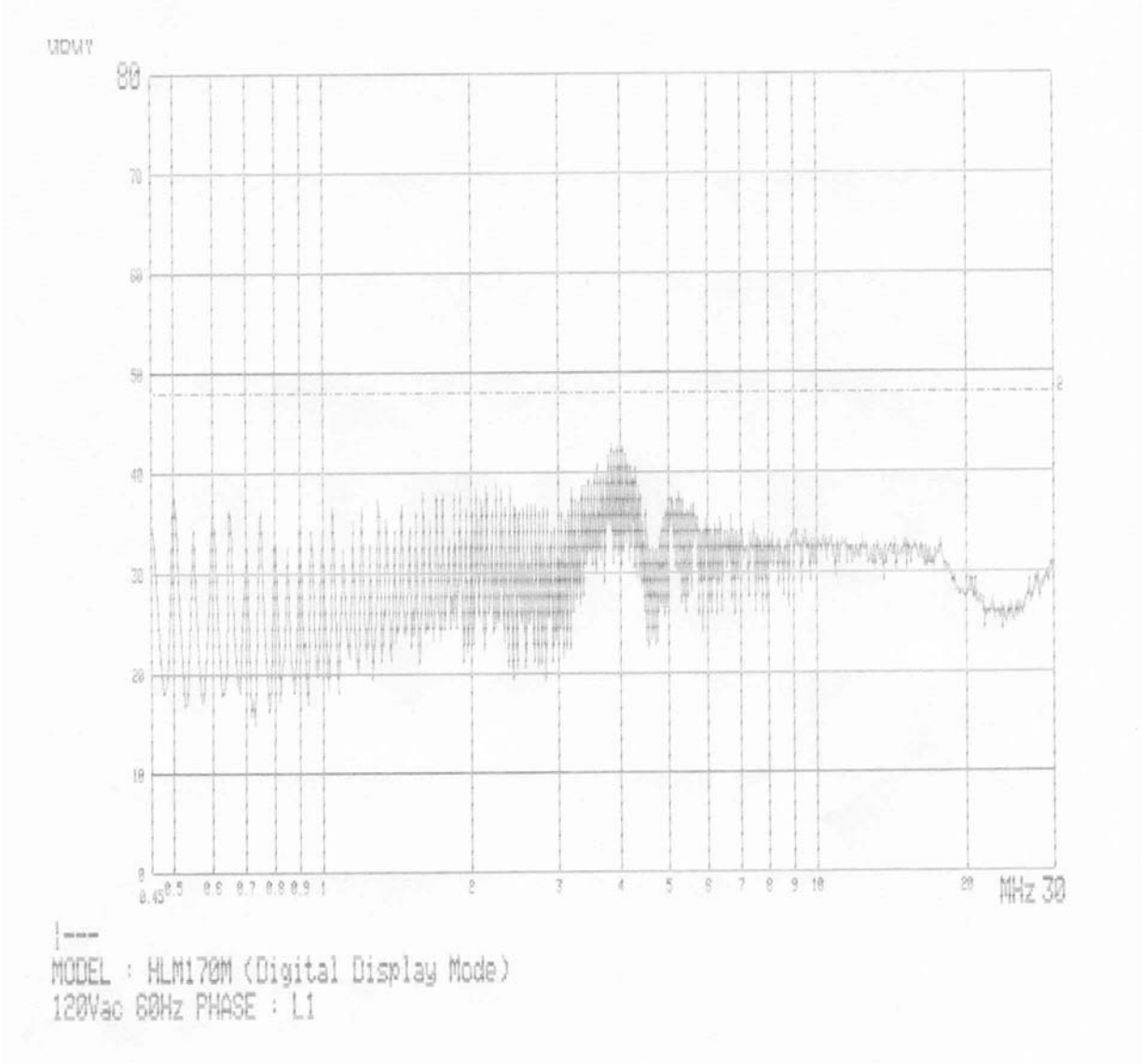

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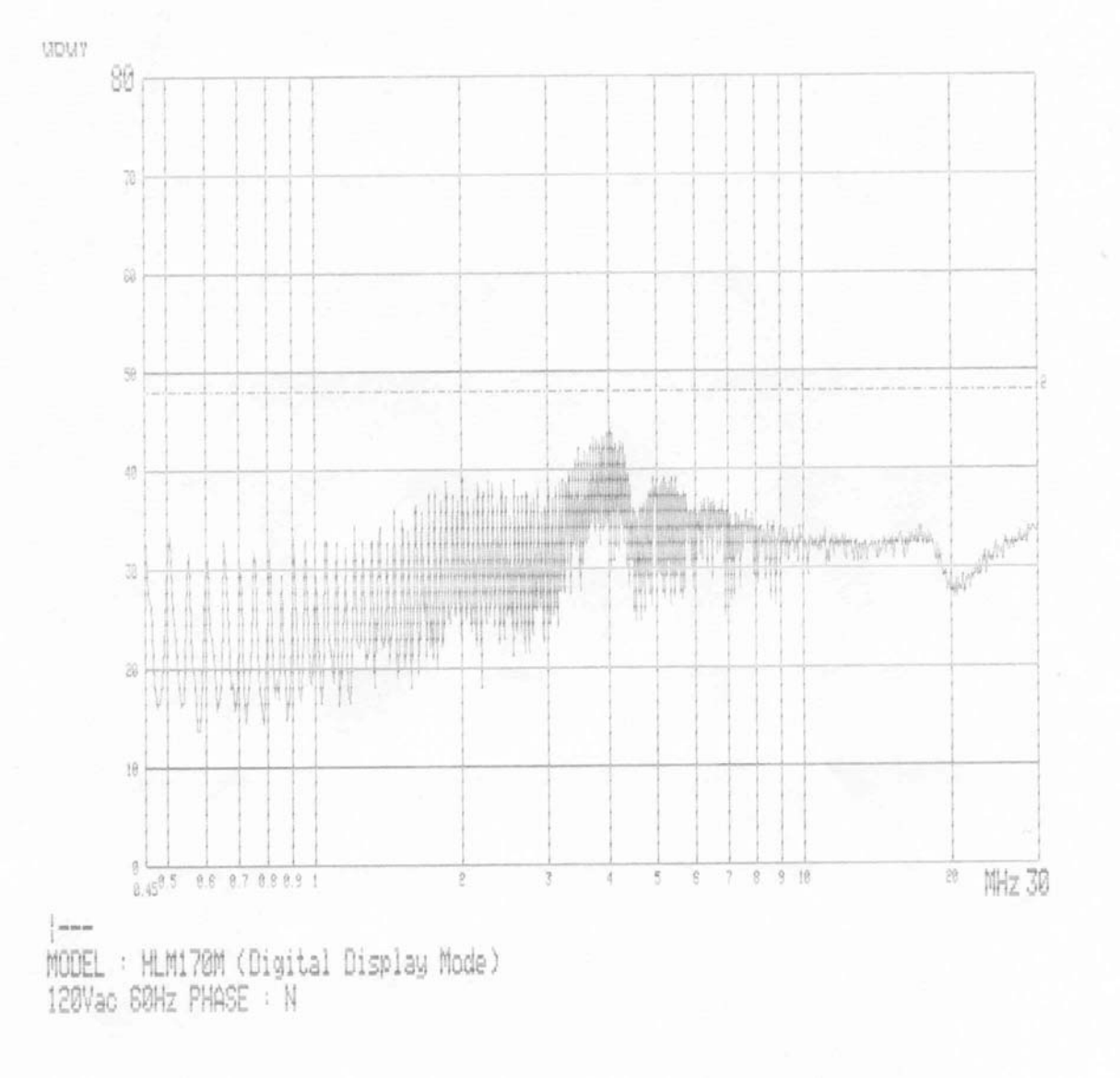

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Radiation Test Data

Test Condition : Digital Display Mode

Type	HLM170M	
Manufacturer	Han Gil Telecom Co., Ltd.	
Operation mode	Scrolling "H" pattern display 1280 x 1024, 75Hz	
	Sound Play Mode	
Environmental Conditon	Temperature	: 17 °C
	Humidity	: 42 %
	Atmospheric pressure	: 1001 mbar
Test distance	3 m	
Antenna	VULB9160	
Date	Mar. 14, 2002	

Freq. [MHz]	Reading [dBuV]	Antenna Factor [dB]	Cable Loss [dB]	Angle [deg]	Height [cm]	Polar [H/V]	Result [dBuV]	Limit [dBuV]	Margin [dB]
33.4	20.1	13.4	1.0	210	100	V	34.5	40.0	5.5
112.0	27.3	9.4	1.9	195	100	V	38.6	43.5	4.9
145.0	22.1	11.9	2.3	180	100	V	36.3	43.5	7.2
167.9	15.6	12.3	2.4	136	100	V	30.3	43.5	13.2
212.6	18.5	8.4	2.6	175	110	V	29.5	43.5	14.0
223.9	29.6	8.8	2.8	226	100	V	41.2	46.0	4.8
257.3	22.6	11.1	2.9	184	100	H	36.6	46.0	9.4
279.9	26.3	11.8	3.1	124	212	H	41.2	46.0	4.8
330.2	21.4	11.7	3.4	264	100	V	36.5	46.0	9.5
335.8	25.6	11.7	3.5	353	189	H	40.8	46.0	5.2
391.8	21.3	12.9	4.1	322	192	H	38.3	46.0	7.7
447.8	21.3	13.9	4.5	268	156	H	39.7	46.0	6.3

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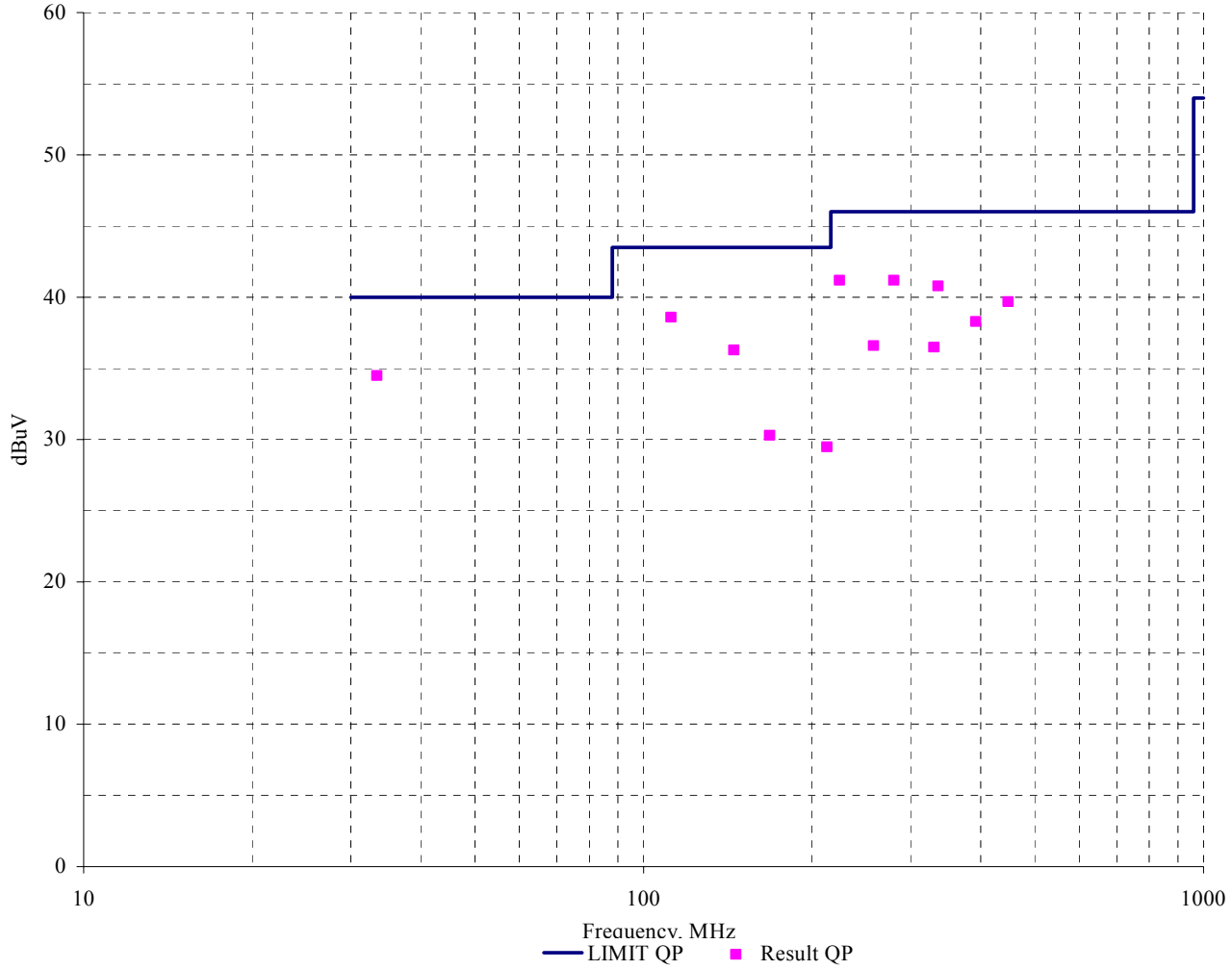

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SUMMARY

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 : Mar. 06, 2002

End of testing : Mar. 21, 2002

Reviewed by :

Joon H, Lee. EMC Manager
Daewoo EMC Lab.

Approved by :

G, Chung. Chief of EMC Lab.

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