CERTiTEK

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EMC TEST REPORT For FCC

Test Report No.	:	CTK02-F025
Date of Issue	:	March 7, 2002
Model/Type No:	:	B15CL
Kind of Product	:	CRT Monitor
Applicant	:	Hansol Electronics Inc.
Applicant Address	:	27-29, Hanchon-Ri, Ducksan-Myun, Jinchon-Gun, Chungbuk, 365-840, Korea
Manufacturer	:	Hansol Electronics Inc.
Manufacturer Address	:	27-29, Hanchon-Ri, Ducksan-Myun, Jinchon-Gun, Chungbuk, 365-840, Korea
Contact Person	:	Mr. S. P. Yang
Telephone	:	+82-43-530-8503
Received Date	:	February 5, 2002
Test period	:	Start: Feb. 6, 2002 End: Mar. 7, 2002
Test Results	:	☒ **In Compliance** ☐ **Not in Compliance**

The test results presented in this report relate only to the object tested.

CERTiTEK Standards Laboratory Co., Ltd. is accredited by Korea Laboratory Accreditation Scheme (KOLAS) which signed the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the above test item(s) and test method(s).

Tested by

Michael Jang
EMC Test Engineer
Date: March 7, 2002

Reviewed by

James Hong
EMC Technical Manager
Date: March 7, 2002

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REPORT REVISION HISTORY

Date	Revision	Page No
Mar. 7, 2002	(CTK02-F025) Issued	All

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TABLE OF CONTENTS

1.0 General Product Description 4
1.1 Model Differences 4
1.2 Device Modifications 4
1.3 EUT Configuration(s) 5
1.6 Calibration Details of Equipment Used for Measurement 6
1.7 Test Facility 6
1.8 Measurement Procedure 6
1.9 Laboratory Accreditations and Listings 7
2.0 Emissions Test Regulations 8
2.1 Conducted Voltage Emissions 9
2.2 Radiated Electric Field Emissions 10
Configurations 11
APPENDIX A - TEST DATA 12
Conducted Voltage Emissions (Quasi-Peak reading) 12
Radiated Electric Field Emissions (Quasi-Peak reading) 15

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1.0 General Product Description

The product is a CRT Monitor.

1.0.1 Tested Equipment

☒ Unless otherwise indicated, all tests were conducted on Model B15CL.

☐ Tests performed on Model _____ were considered to be representative of Model(s) _____.

1.0.2 Equipment Size, Mobility and Identification

Dimensions:	371 by 398 by 375	☒ mm	☐ in
Mobility:	☐ Hand-Held	☒ Table-top	☐ Floor-standing
Serial No.:	-		

1.0.3 Electrical Ratings

Input:	AC100-240V, 1.3A
Output:	Not applicable

1.0.4 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage:	120VAC
Frequency:	60Hz

1.0.5 Clock & Other Frequencies Utilized

1. Switching IC : 150kHz
2. Pre-Amp : 110MHz
3. Video output : 75MHz
4. OSD (On Screen Display) IC : 96MHz
5. Sync Processor : 15-150kHz (Horizontal), 35-200Hz (Vertical), 50-180Hz (Autosync.)
6. MICRO Controller : 8-12MHz

1.1 Model Differences

Not applicable

1.2 Device Modifications

The following modifications were necessary for compliance:

Addition to the capacitor – C433 (0.01uF/2kV)

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1.3 EUT Configuration(s)

See Appendix A for individual test set-up configuration(s). The following peripheral devices and/or interface cables were connected during the measurement:

☒ Peripheral Devices

Device	Manufacturer	Model No.	Serial No.	FCC ID or DoC
PC	Hewlett Packard	DTPC-17	SG01501776	DOC
MOUSE (Serial type)	Microsoft	BASM1	4475951-20000	DOC
MOUSE (PS/2 type)	PANWEST	Cyber Beetle	PM1F184045737	DOC
MOUSE (USB type)	PANWEST	Cyber Beetle	PM1F154000055	DOC
MOUSE (USB type)	PANWEST	Cyber Beetle	PM1F144009945	DOC
KEYBOARD	World Com Mart	KB120	-	D840902 MIC
Game Pad	Microsoft	Sidewinder game pad	03426853	C3KMGP1
HEADSET	CAMAC	CMK-C3	-	-
PRINTER	Seiko Epson	Stylus Color 460	BWCE136524	DOC

☒ Cable Description

#	Description	Ferrited	Length (m)	Other Details
1	AC Power, Unshielded	No	1.8	Connect to AC Power from EUT
2	AC Power, Unshielded	No	1.8	Connect to AC Power from PC
3	AC Power, Unshielded	No	1.8	Connect to AC Power from printer
4	Monitor cable, Shielded	Yes	1.8	Connect to PC
5	Printer cable, Shielded	Yes	1.8	Connect to PC
6	Mouse cable, Shielded	No	2.0	USB Type
7	Mouse cable, Shielded	No	2.0	USB Type
8	Mouse cable, Shielded	No	2.0	PS/2 Type
9	Mouse cable, Shielded	No	2.0	Serial Type
10	Keyboard cable, Shielded	No	2.0	-
11	Line in cable, Unshielded	No	1.5	-
12	Headset cable, Unshielded	No	2.0	-
13	Game Pad cable, Unshielded	No	2.0	-

n/a = not available

1.4 Test Software

☐ Pinging
☒ Name / Manufacturer / Version / Type of Pattern
- EMC Test / Compaq Computer / 1.0 / Scrolling 'H'

1.5 EUT Operating Mode(s)

Equipment under test was operated during the measurement under the following conditions:

☒ Test program (H-Pattern)
☐ Test program (color bar)
☐ Standby
☐ Test program (customer specific)
☐ Practice operation
☒ Resolution / Refresh Rate - 800 x 600 / optimum and 1280 x 1024 / 60Hz

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1.6 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

1.7 Test Facility

The measurement facility is located at 386-1, Ho-Dong, Yongin-City, Kyungki-Do, Korea 449-100. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.8 Measurement Procedure

Preliminary AC power line conducted emissions tests were performed shielded room. To find worst mode, several typical mode and typical cable position were tested.
Final AC power line conducted emissions test was performed shielded room. (location is same as Preliminary test)
Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

Preliminary radiated emissions test were performed anechoic chamber (Distance of antenna and EUT was 3 m). To find worst mode, several typical mode and typical cable position were tested and peak level and frequency were recorded.

Final radiated emissions test was performed Open Area Test Site. Based on the preliminary tests of the EUT, final test was proceeded worst case test mode and cable configuration.

* Measurement procedures was In accordance with ANSI C63.4-1992 7.2.3, 7.2.4, 8.3.1.1, 8.3.1.2

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1.9 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	**FCC**	3 and 10 meter Open Area Test Sites to perform FCC Part 15/18 measurements.	93250
JAPAN	**VCCI**	10 meter Open Area Test Site and one conducted site.	R-948, C-986
KOREA	**MIC**	EMI (CE, RE) EMS (ESD, Burst, RS, Surge, CS, Power-Frequency Susceptibility, Voltage Dips and Short Interruptions)	No. 51, KR0025
International	**KOLAS**	EMC	

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2.0 Emissions Test Regulations

The emissions tests were performed according to following regulations:

☐ EN 50081-1 /1992		
☐ EN 55011 /1998	☐ Group 1 ☐ Class A	☐ Group 2 ☐ Class B
☐ EN 55013 /A12:1994		
☐ EN 55014 /1987	☐ Household appliances and similar ☐ Portable tools ☐ Semiconductor devices	
☐ EN 55014 /A2:1990		
☐ EN 55014 /1993	☐ Household appliances and similar ☐ Portable tools ☐ Semiconductor devices	
☐ EN 55015 /1987 ☐ EN 55015 /A1:1990 ☐ EN 55015 /1993		
☐ EN 55022 /A1:1995	☐ Class A	☐ Class B
☐ EN 55022 /1998	☐ Class A	☐ Class B
☐ EN 61000-3-2 Ed.2:2001; IEC 61000-3-2 Ed.2:2000 ☐ EN 61000-3-3 /1995 (EN 60555 Part 3 /4.87)		
☐ BS		
☐ VCCI V-3/99.05 : 1999	☐ Class A	☐ Class B
☒ FCC Part 15 SUBPART B	☐ Class A	☒ Class B
☐ AS 3548 (1992)	☐ Class A	☐ Class B
☐ CISPR 11 (1990)	☐ Group 1 ☐ Class A	☐ Group 2 ☐ Class B
☒ CISPR 22 (1993)	☐ Class A	☒ Class B

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2.1 Conducted Voltage Emissions

Test Date
March 7, 2002

Test Location
EMI-CE: Shielded Room

Test Instruments

☒ Field Strength Meter	Rohde Schwarz	ESHS30	828144/002

Test Accessories

☐ LISN	EMCO	3825/2	9206-1971
☒ LISN	EMCO	3825/2	9409-2246
☒ LISN	EMCO	3825/2	9607-2574
☒ Control PC	HP	Vectra 500	SG72000192

Frequency Range of Measurement
☒ 150 kHz to 30 MHz
☐ 450 kHz to 30 MHz
☐ _____

Instrument Settings
IF Band Width: 9 kHz

Test Results
The requirements are:

☒ MET minimum margin is 3.6 dBμV at 0.15 MHz
☐ NOT MET limit exceeded by maximum of ____ dBμV at _____ MHz
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.2 Radiated Electric Field Emissions

Test Date
March 7, 2002

Test Location
☒ EMI-OATS: Testing was performed at a test distance of 10 m
☐ EMI-OATS: Testing was performed at a test distance of 3 m

Test Instruments

☒ Field Strength Meter	Rohde Schwarz	ESVS30	826638/008

Test Accessories

☒ ULTRA Broadband Antenna	R & S	HL562	361324/014
☐ Biconical Antenna	Schwarzbeck	BBA9106	41-00201
☐ Biconical Antenna	EMCO	3110B	9607-2564
☐ Log-periodic Antenna	EMCO	3146	9607-4567

Frequency Range of Measurement
30 MHz to 2 GHz

Instrument Settings
IF Band Width: 120 kHz

Test Results
The requirements are:

☒ MET minimum margin is 3.00 dB (μV/m) at 161.0 MHz
☐ NOT MET limit exceeded by maximum of ____ dB(μV/m) at _____ MHz
☐ NOT APPLICABLE

Remarks
See Appendix A for test data

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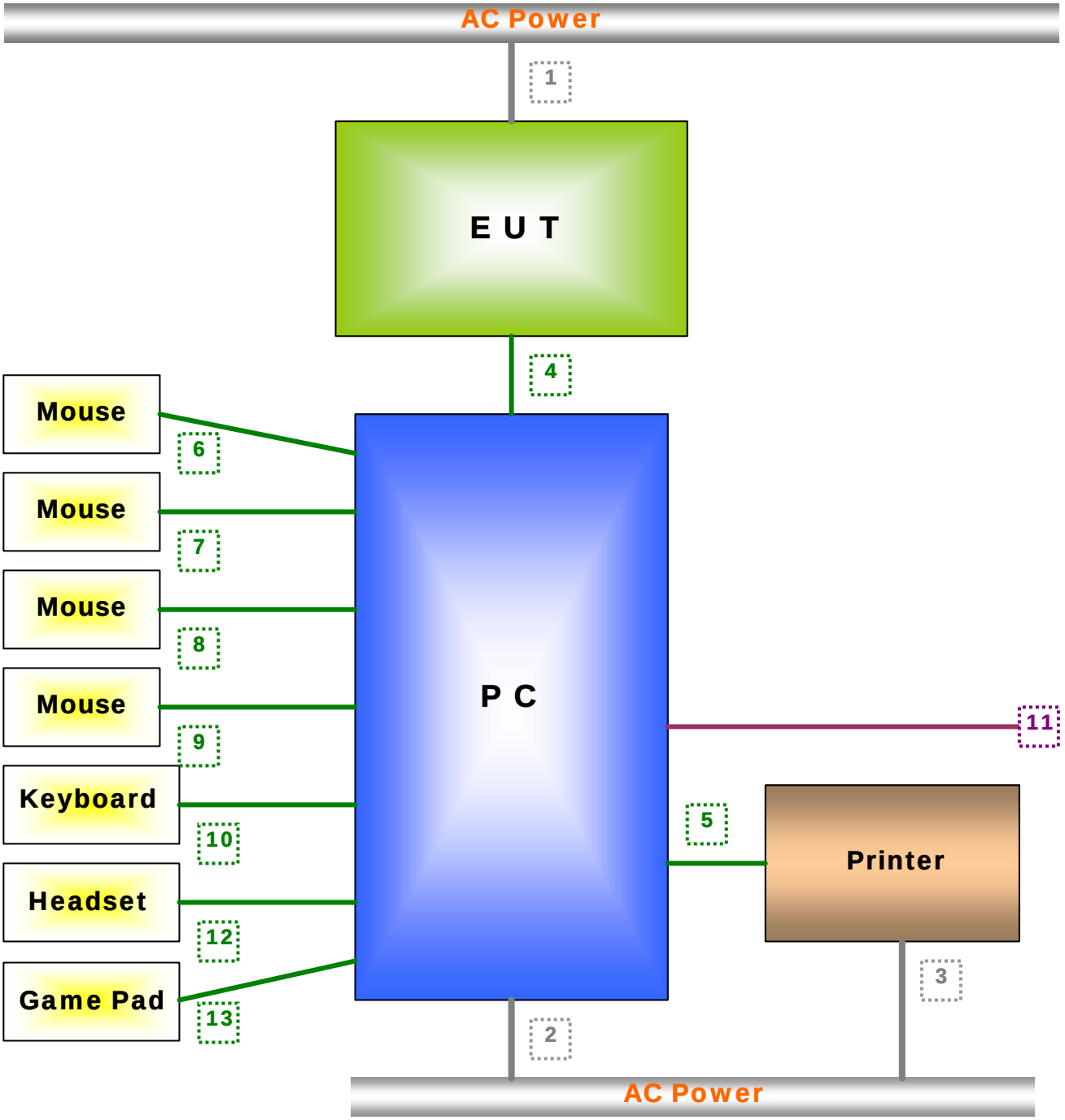
Configuration



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APPENDIX A – TEST DATA

Conducted Voltage Emissions (Quasi-Peak reading)

800 x 600 / optimum

Frequency	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]
[MHz]											
0.15	3.0	0.1	N	66.0	59.3	62.4	3.6	56.0	46.9	50.0	6.0
0.20	2.3	0.1	N	63.8	52.2	54.6	9.2	53.8	40.3	42.7	11.1
0.25	1.5	0.1	N	61.9	46.4	48.0	14.0	51.9	35.5	37.1	14.8
13.08	0.4	0.2	N	60.0	44.8	45.4	14.6	50.0	38.2	38.8	11.3
16.00	0.4	0.2	L	60.0	51.0	51.6	8.4	50.0	36.0	36.6	13.4
20.80	0.6	0.4	L	60.0	46.7	47.7	12.3	50.0	16.8	17.8	32.2
22.40	0.6	0.3	L	60.0	41.9	42.8	17.2	50.0	18.8	19.7	30.3

1280 x 1024 / 60Hz

Frequency	Correction Factor		Line	Quasi-peak				Average			
	LISN	Cable		Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]	Limit [dBuV]	Reading [dBuV]	Result [dBuV]	Margin [dB]
[MHz]											
0.21	2.3	0.1	L	63.4	47.8	50.2	13.2	53.4	38.2	40.6	12.8
18.89	0.6	0.2	L	60.0	44.4	45.2	14.9	50.0	39.1	39.9	10.1
22.94	0.6	0.4	L					50.0	34.5	35.5	14.5
23.15	0.6	0.4	L	60.0	41.6	42.6	17.4	50.0	34.8	35.8	14.3
23.22	0.6	0.4	N	60.0	41.4	42.4	17.7	50.0	34.6	35.6	14.4

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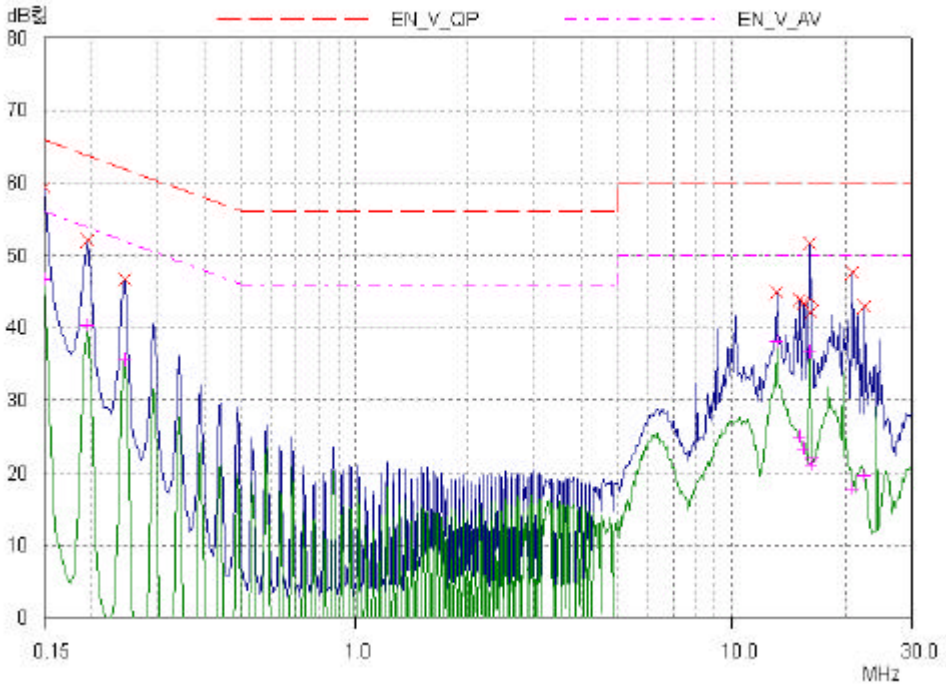
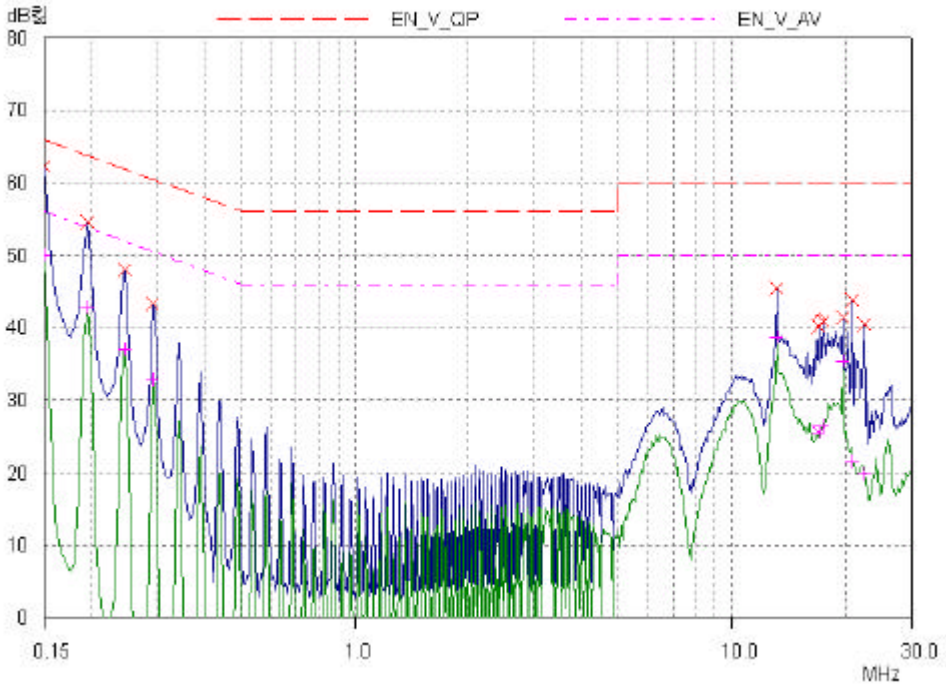
800 x 600 / optimum





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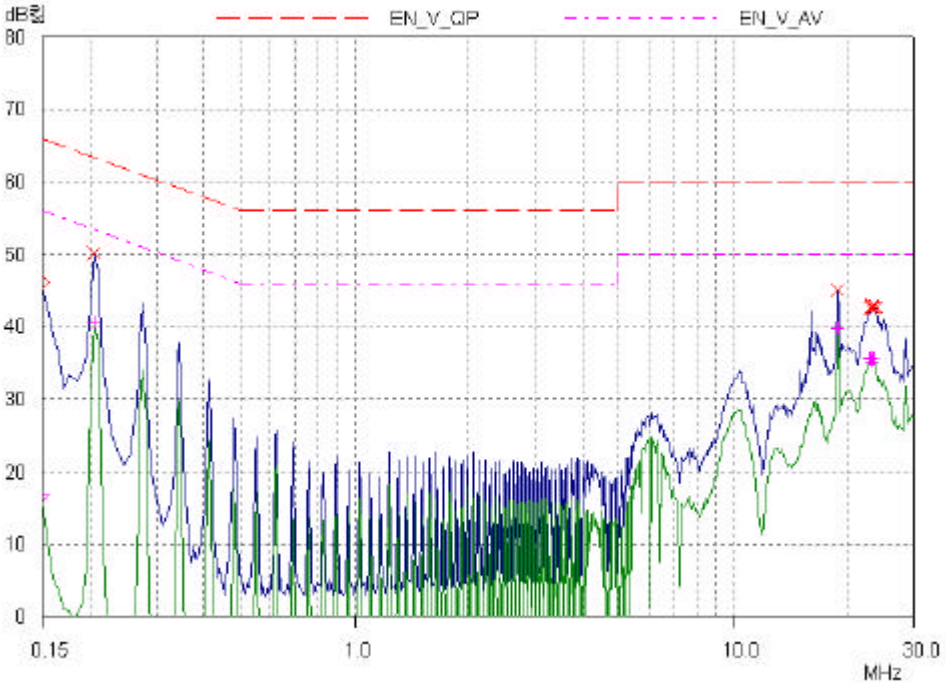
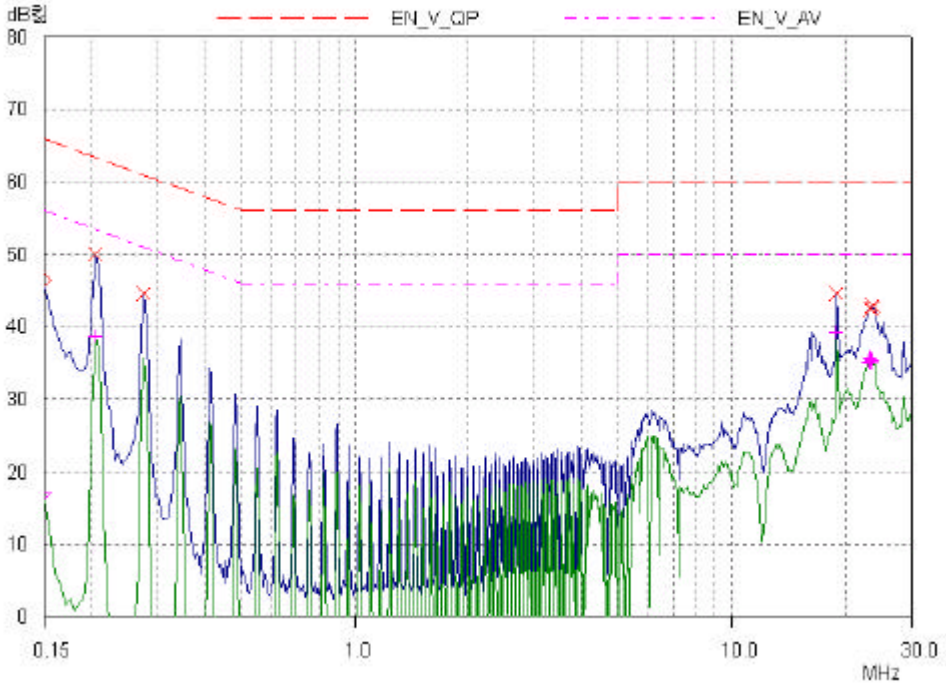
1280 x 1024 / 60Hz





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Radiated Electric Field Emissions (Quasi-Peak reading)

800 x 600 / optimum

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor Antenna	Correction Factor Cable	Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
136.00	16.2	H	4.0	8.40	2.30	30.0	26.90	3.10
140.00	14.8	V	1.1	8.00	2.40	30.0	25.18	4.82
156.90	11.8	V	1.0	7.40	2.50	30.0	21.74	8.26
252.10	13.7	H	3.8	9.50	3.10	37.0	26.33	10.67
291.90	14.9	H	3.8	10.75	3.60	37.0	29.24	7.76
297.30	12.9	H	4.0	10.90	3.60	37.0	27.41	9.59
762.00	6.3	V	1.2	19.00	6.10	37.0	31.40	5.60
799.00	6.8	H	3.8	19.50	6.60	37.0	32.91	4.09
808.00	7.1	V	1.0	19.60	6.60	37.0	33.27	3.73
1110.00	0.7	V	1.0	22.70	7.40	37.0	30.80	6.20

1280 x 1024 / 60Hz

Frequency [MHz]	Reading [dBuV/m]	Pol.	Height [m]	Correction Factor Antenna	Correction Factor Cable	Limits [dBuV/m]	Result [dBuV/m]	Margin [dB]
142.10	16.6	H	4.0	7.90	2.40	30.0	26.90	3.10
161.00	17.1	H	3.8	7.30	2.60	30.0	27.00	3.00
170.40	16.7	H	4.0	7.10	2.60	30.0	26.43	3.57
255.50	21.1	H	3.5	9.60	3.30	37.0	33.96	3.04
264.90	19.7	H	3.5	9.90	3.30	37.0	32.85	4.15
283.80	20.1	H	4.0	10.50	3.40	37.0	33.99	3.01
398.00	9.9	V	1.0	13.50	4.10	37.0	27.49	9.51
660.50	7.1	V	1.2	18.30	5.50	37.0	30.90	6.10

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