



ELECTROMAGNETIC EMISSION COMPLIANCE REPORT FOR FCC CLASS B CERTIFICATION

Test report file number : E035R-010

Applicant : Mbestek Inc.

Address : 3 Fl. Bo Sung B/D, 1425-1, Seocho-Dong, Seocho-Ku, Seoul, Korea

Manufacturer : Mbestek Inc.

Address : 3 Fl. Bo Sung B/D, 1425-1, Seocho-Dong, Seocho-Ku, Seoul, Korea

Type of Equipment : TFT-LCD Monitor

FCC ID. : QRHMB151AT

Model Name : MB151AT

Serial Number : N/A

Total page of Report : 14 pages (including this page)

Date of Incoming : February 15, 2003

Date of Issuing : May 14, 2003

SUMMARY

The equipment complies with the regulation; **FCC PART 15 CFR 47 SUBPART B, Class B**.

This test report contains only the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

Prepared by:

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CONTENTS

	Page
1. VERIFICATION OF COMPLIANCE.....	3
2. GENERAL INFORMATION	4
2.1 PRODUCT DESCRIPTION.....	4
2.2 RELATED SUBMITTAL(S) / GRANT(S)	4
2.3 TEST SYSTEM DETAILS.....	5
2.4 TEST METHODOLOGY	5
2.5 TEST FACILITY	5
3. SYSTEM TEST CONFIGURATION.....	6
3.1 JUSTIFICATION	6
3.2 EUT EXERCISE SOFTWARE.....	6
3.3 CABLE DESCRIPTION.....	7
3.4 NOISE SUPPRESSION PARTS ON CABLE	7
3.5 EQUIPMENT MODIFICATIONS.....	8
3.6 CONFIGURATION OF TEST SYSTEM.....	8
4. PRELIMINARY TEST	9
4.1 AC POWER LINE CONDUCTED EMISSION TEST	9
4.2 RADIATED EMISSION TEST.....	9
5. FINAL RESULT OF MEASURMENT	10
5.1 CONDUCTED EMISSION TEST	10
5.2 RADIATED EMISSION TEST.....	12
6. FIELD STRENGTH CALCULATION	13
7. LIST OF TEST EQUIPMENT.....	14



1. VERIFICATION OF COMPLIANCE

APPLICANT : Mbestek Inc.
ADDRESS : 3 Fl. Bo Sung B/D, 1425-1, Seocho-Dong, Seocho-Ku, Seoul, Korea
CONTACT PERSON : Mr. Jung-Myoung, Doe / Manager
TELEPHONE NO. : +82-2-583-4330
FCC ID : QRHMB151AT
MODEL NAME : MB151AT
SERIAL NUMBER : N/A
DATE : May 14, 2003

DEVICE TYPE	Peripheral Device for Class B Computing Device -UNINTENTIONAL RADIATOR
E.U.T. DESCRIPTION	TFT-LCD Monitor
THIS REPORT CONCERNS	ORIGINAL GRANT
MEASUREMENT PROCEDURES	ANSI C63.4/1992
TYPE OF EQUIPMENT TESTED	PRE-PRODUCTION
KIND OF EQUIPMENT AUTHORIZATION REQUESTED	CERTIFICATION
EQUIPMENT WILL BE OPERATED UNDER FCC RULES PART(S)	FCC PART 15 SECTION 15.101(CLASS B)
MODIFICATIONS ON THE EQUIPMENT TO ACHIEVE COMPLIANCE	N/A
FINAL TEST WAS CONDUCTED ON	3 METER OPEN AREA TEST SITE

- This device has shown compliance with the conducted emissions limits in 15.107 adopted under FCC 02-107 (ET Docket 98-80). The device may be marketed after July 11, 2005 and is not affected by the 15.37(j) transition provisions.
- The above equipment was tested by ONETECH Corp. for compliance with the requirement set forth in the FCC Rules and Regulations. This said equipment in the configuration described in this report, shows the maximum emission levels emanating from equipment are within the compliance requirements.



2. GENERAL INFORMATION

2.1 Product Description

The Mbestek Inc., Model MB151AT (referred to as the EUT in this report) is a 15.1" TFT-LCD Monitor With TV Tuner. The Verification report for the TV Tuner in the EUT shall be issued with other test report numbers. The Product specification described herein was obtained from product data sheet or user's manual.

CHASSIS TYPE	Plastic – Non coated
LIST OF EACH OSC. OR CRY. FREQ.(FREQ.>=1MHz)	24.576 MHz, 14.31818 MHz, 16MHz on the main board
LCD PANEL SPEC.	LM151 (X05) / LG. PHILIPS LCD
INPUT VIDEO SIGNAL	VGA Compatible Analog RGB
DISPLAY MODE	Normally White
DISPLAY RESOLUTION	Maximum: 1024 x 768, 75Hz
POWER REQUIREMENT	DC 12V, 3.3A, from the AC/DC Adaptor
USED AC/DC ADAPTERS	DA-400 manufactured by DANAETECH.
NUMBER OF LAYERS	Main Board: 4 Layers, OSD1/2 Board: 2 Layers, DC/AC Inverter Board: 2 Layers
EXTERNAL CONNECTORS	Power In Terminal, D-SUB Terminal, S-Video Input, Composite Video Input, Audio Input (Left), Audio Input (Right), PC Audio Input, PC Audio Output, Antenna Input

Model Differences:

- None

2.2 Related Submittal(s) / Grant(s)

- Original submittal only



2.3 Test System Details

The model numbers for all the equipments, which were used in the tested system, is:

Model	Manufacturer	Description	FCC ID	Connected to
MB151AT	Mbestek Inc.	TFT-LCD Monitor (EUT)	QRHMB151AT	Notebook PC
PP01L	Dell Computer Corp	Notebook PC	DoC	EUT
ADP-70EB	Delta Electronics	AC/DC ADAPTER	N/A	Notebook PC
GHV-S9990	GOLDSTAR	VCR	N/A	EUT
X06-08477	Microsoft Corp.	MOUSE	DoC	Notebook PC
2225C	HP	PRINTER	DSI6XU2225	Notebook PC
DA-400	DANAE TECH.	AC/DC ADAPTER	N/A	EUT
SP202	FENG SHIN Cable Co., Ltd.	SPEAKER	N/A	EUT

2.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4/1992.

Radiated testing was performed at a distance of 3 meters from EUT to the antenna.

2.5 Test Facility

The open area test site and conducted measurement facilities are located on at 426-1 Daessangryung-Ri, Chowol-Myun, Kwangju-City, Kyounggi-Do, 464-080, Korea. Description details of test facilities were submitted to the Commission on January 18, 2002. (Registration Number: 92819)



3. SYSTEM TEST CONFIGURATION

3.1 Justification

This device was configured for testing in a typical way as a normal customer is supposed to be used. During the test, the following components were installed inside of the EUT.

DEVICE TYPE	MANUFACTURER	MODEL/PART NUMBER	FCC ID
Main Board	Mbestek Inc.	MN02920440	N/A
LCD Panel	LG. PHILIPS LCD	LM151 (X05)	N/A
TV Tuner	LG	TAPC-H701F	N/A
DC/AC Inverter Board	N/A	AT-0151MB	N/A
OSD Board 1	Mbestek Inc.	OSD-MB04-1	N/A
OSD Board 2	Mbestek Inc.	OSD-MB04	N/A

3.2 EUT exercise Software

The windows program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. This program was included into HOST. Once loaded, this program sequentially exercises each system component in turn. The sequence used is: (1) series of "H" characters are printed on the monitor until the screen is completely full, (2) copy series of "H" characters to mass storage device (if one is used), (3) print series of "H" characters to printer. The complete cycle is repeated continuously.

The test was performed about each resolution from minimum resolution to maximum resolution for getting maximum noise level and the investigated worst resolution mode of the EUT was 1024 x 768, 75Hz.



3.3 Cable Description

	Power Cord Shielded (Y/N)	I/O cable Shielded (Y/N)	Length (M)
TFT-LCD Monitor (EUT)	N	Y	1.5(P), 1.2(D)
Notebook PC	N	Y	1.8(P), 2.0(D)
ADAPTER	N	Y	1.8 (P), 1.8 (D)
VCR	N	N	1.8(P), 1.5D)
MOUSE	N/A	Y	1.2 (D)
PRINTER	N	Y	1.8(P), 1.2(D)
AC/DC ADAPTER	N	N	1.5(P), 1.2(D)
SPEAKER	N	N	1.0(D)

* The marked "(D)" means the Data Cable and "(P)" means the Power Cable.

3.4 Noise Suppression Parts on Cable

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
TFT-LCD Monitor (EUT)	Y	BOTH END	Y	BOTH END
Notebook PC	-	-	-	-
ADAPTER	Y	NOTE PC END	Y	Notebook PC END
VCR	N	N/A	Y	BOTH END
MOUSE	N	N/A	Y	Notebook PC END
PRINTER	N	N/A	Y	BOTH END
AC/DC ADAPTER	Y	EUT END	Y	EUT END
SPEAKER	N	N/A	Y	EUT END



3.5 Equipment Modifications

To achieve compliance to CLASS B levels, the following change(s) was made by ONETECH Corp. during compliance testing:

1. Changed the Resistor to Bead 121ohm (1608 Size) at FB401 on the main board.
2. Changed Resistor to Bead 151ohm(1608 Size) at R31, R310, R506 and R507 on the main board.
3. Changed Resistor to Array Bead 301(3216 Size) at R401~406 and R413 on the main board.
4. Changed Resistor to Array Bead 600(3216 Size) at RN101~106 and RN701~705 on the main board.
5. Changed Capacitor Values to 33pF at C401, 15pF at C18 and C13, 100pF at C310 and 0.1uF at C27 and C26 on the main board.
6. Added bypass capacitors (27pF-1608 Size) to the all pins of connector at J401.
7. Added bypass capacitors (0.1uF-1608 Size) to the all pins of connector JMP1.
8. Changed bypass capacitors to 0.1uF at C502~C504.
9. Added a ground Wire on the OSD1/OSD2 board.
10. Added the Ferrite core on Video signal cable from main B/D to LCD Panel.

3.6 Configuration of Test System

Line Conducted Test: AC/DC adapter supplied the power of the EUT and the adapter was connected to LISN. All supporting equipments were connected to another LISN. Preliminary Power line Conducted Emission test was performed by using the procedure in ANSI C63.4/1992 7.2.3 to determine the worse operating conditions.

Radiated Emission Test: Preliminary radiated emission test was conducted using the procedure in ANSI C63.4:1992 8.3.1.1 to determine the worse operating conditions. Final radiated emission test was conducted at 3 meters open area test site.



4. PRELIMINARY TEST

4.1 AC Power line Conducted Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Resolution: 640 x 480	
Resolution: 800 x 600	
Resolution: 1024 x 768	X

4.2 Radiated Emission Test

During Preliminary Test, the following operating mode was investigated

Operation Mode	The Worse operating condition (Please check one only)
Resolution: 640 x 480	
Resolution: 800 x 600	
Resolution: 1024 x 768	X

**5. FINAL RESULT OF MEASUREMENT**

Preliminary test was done in normal operation mode. And the final measurement was selected for the maximized emission level.

5.1 Conducted Emission Test

Humidity Level : 38% Temperature : 21°C

Limits apply to : FCC CFR 47, PART 15, SUBPART B, SECTION 15.107

Type of Test : CLASS B

Result : PASSED BY -12.72 dB at 0.18 MHz with Peak detector mode

EUT : TFT-LCD Monitor Date : April 25, 2003

Operating Condition : Continuously displayed "H" characters on the screen of the EUT

Detector : CISPR Quasi-Peak and Average (6 dB Bandwidth: 9 kHz)

Resolution : 1024 x 768, 75Hz

Frequency (MHz)	Line	Quasi-Peak (dBuV)			Margin (dB)	Average (dBuV)		Margin (dB)
		Emission Level	Detector Mode	Limits*		Emission level	Limits	
0.18	N	52.00	P	64.72	-12.72	-	54.72	-
0.24	N	44.23	P	62.27	-18.04	-	52.27	-
0.29	N	41.19	P	60.52	-19.33	-	50.52	-
0.35	H	39.43	P	58.96	-19.53	-	48.96	-
15.00	H	45.35	P	60.00	-14.65	-	50.00	-
15.30	N	45.09	P	60.00	-14.91	-	50.00	-

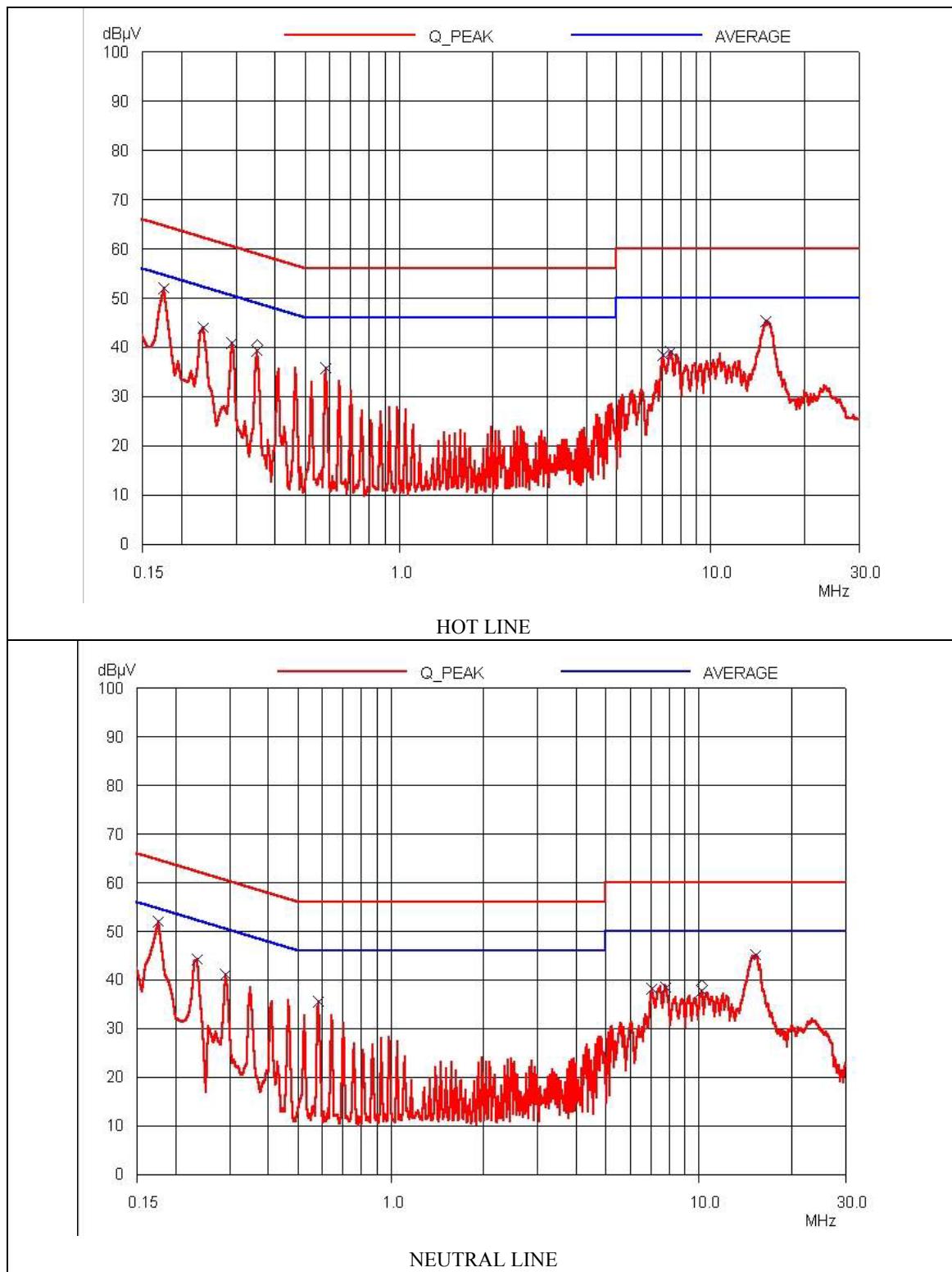
Line Conducted Emission Tabulated Data

Remark : "H": Hot Line, "N": Neutral line, "P": Peak detector, "Q.P.": Quasi-Peak Detector Mode.

Average modes were not measured, because measured peak values were under the average limit.

See next page for an overview sweep performed with peak detector.

Tested by : Dan-Gi, Lee / Project Engineer





5.2 Radiated Emission Test

The following table shows the highest levels of radiated emission on both polarizations of horizontal and vertical.

Humidity Level	: <u>39 %</u>	Temperature : <u>19°C</u>
Limits apply to	: <u>FCC CFR 47, PART 15, SUBPART B, SECTION 15.109</u>	
Type of Test	: <u>CLASS B</u>	
Result	: <u>PASSED BY -3.26 dB at 943.00 MHz</u>	

EUT	: TFT-LCD Monitor	Date : April 25, 2003
Operating Condition	: Continuously displayed "H" characters on the screen of the EUT	
Detector	: CISPR Quasi-Peak (6 dB Bandwidth: 120 kHz)	
Distance	: 3 Meter	
Resolution	: 1024 x 768, 75Hz	

Radiated Emission		Ant	Correction Factors		Total	FCC CLASS B	
Freq. (MHz)	Amp. (dBuV)	Pol.	Ant. (dBuV/m)	Cable (dB)	Amp. (dBuV/m)	Limit (dBuV/m)	Margin (dB)
57.28	24.3	V	9.79	0.98	35.07	40.00	-4.93
102.30	22.1	V	12.41	1.16	35.67	43.50	-7.83
114.50	22.9	V	13.14	1.22	37.26	43.50	-6.24
121.48	23.3	V	13.39	1.24	37.93	43.50	-5.57
157.7	19.5	V	15.15	1.38	36.03	43.50	-7.47
179.12	17.2	V	16.07	1.45	34.72	43.50	-8.78
186.23	15.1	V	16.37	1.48	32.95	43.50	-10.55
706.30	17.7	H	20.81	3.35	41.86	46.00	-4.14
772.90	17.2	H	20.79	3.60	41.59	46.00	-4.41
864.10	16.2	H	22.26	3.87	42.33	46.00	-3.67
943.00	15.6	H	23.06	4.08	42.74	46.00	-3.26

Radiated Emission Tabulated Data

Tested by : Dan-Gi, Lee / Project Engineer



6. FIELD STRENGTH CALCULATION

Meter readings are compared to the specification limit correcting for antenna and cable losses

+ Meter reading (dBuV)

+ Cable Loss (dB)

+ Antenna Factor (Loss) (dB/meter)

= Corrected Reading (dBuV/meter)

- Specification Limit (dBuV/meter)

= dB Relative to Spec (+/- dB)



7. LIST OF TEST EQUIPMENT

No.	EQUIPMENTS	MFR.	MODEL	SER. NO.	LAST CAL	DUE CAL	USE
1.	Test receiver	R/S	ESVS 10	827864/005	OCT/02	12MONTH	■
2.	Test receiver	R/S	ESHS10	834467/007	APR/03	12MONTH	■
3.	Spectrum analyzer	HP	8568B	3026A0226	APR/03	12MONTH	■
4.	RF preselector	HP	85685A	3107A01264	APR/03	12MONTH	■
5.	Quasi-Peak Adapter	HP	85650A	3107A01542	APR/03	12MONTH	■
6.	Dipole Antenna	EMCO	3121C	9107-745	JUN/02	12MONTH	
7.	Biconical antenna	EMCO	3104C	9109-4441 9109-4443 9109-4444	APR/03	12MONTH	■
8.	Log Periodic antenna	EMCO	3146	9109-3213 9109-3214 9109-3217	JUN/02	12MONTH	■
9.	LISN	EMCO	3825/2	9109-1867 9109-1869	JUN/02	12MONTH	■
10.	RF Amplifier	HP	8447F	3113A04554	JUN/02	N/A	
11.	Spectrum Analyzer	HP	8591A	3131A02312	APR/03	12MONTH	
12.	Computer System Hard disk drive	HP	98581C 9153C	98543A CMC762Z9153	N/A N/A	N/A N/A	
13.	Plotter	HP	7475A	30052 22986	N/A	N/A	
14.	Position Controller	EMCO	1090	9107-1038	N/A	N/A	■
15.	Turn Table	EMCO	1080-1.21	9109-1576	N/A	N/A	■
16.	Antenna Master	EMCO	1070-1	9109-1624	N/A	N/A	■

* Mark “■” means used equipment.