

Application for FCC Certificate
On Behalf of
LG Electronics U.S.A Inc.

Color Monitor

Model No.: T17LM-*

Serial No.: 44TAE26490238

FCC ID : BEJT17LM

Prepared For :LG Electronics U.S.A Inc.
2000 Millbrook Dr.Lincolnshire,
IL 60069 United States

Prepared By :Audix Technology (Shanghai) Co., Ltd.
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Report No. :ACI-F04052
Date of Test :June 30-July 7, 2004
Date of Report :July 21, 2004

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TEST REPORT FOR FCC CERTIFICATE

Applicant : LG Electronics U.S.A Inc.
Manufacturer : Nanjing LG-Tontru Color Display System Co., Ltd.
EUT Description : Color Monitor
(A) Model No. : T17LM-
(B) Serial No. : 44TAE26490238
(C) Power Supply : AC100-240V, 50/60Hz, 2.0A

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B JULY 2003
AND ANSI C63.4-2001*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B (Class B) limits both radiated and conducted emissions.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (M/N: T17LM-*; S/N: 44TAE26490238) which was tested in 3m anechoic chamber on June 30-July 7, 2004 to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

This report contains data that are not covered by the NVLAP accreditation.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : June 30-July 7, 2004

Prepared by : Candy Xi 2004.7.23 Test Engineer : Cloud Peng 2004.07.23
CANDY XI (Assistant) CLOUD PENG (Engineer)
Reviewer : Sammy Chen 2004.7.27 Approved Signatory : Byron Kwo 2004.7.27
SAMMY CHEN (Engineer) BYRON KWO (Assistant Manager)
Authorized Signature(s)

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test

Description : Color Monitor

Type of EUT : ☒ Production ☐ Pre-product ☐ Pro-type

Model No. : T17LM-*

Serial No. : 44TAE26490238

Applicant : LG Electronics U.S.A Inc.
2000 Millbrook Dr.Lincolnshire,
IL 60069 United States

Manufacturer : Nanjing LG-Tontru Color Display System
Co., Ltd.
No.346, YaoXin Road, Nanjing China

1.2 Supported Simulators

1.2.1 PC

Manufacturer : HP

Model Number : Pavilion 8626

Serial Number : CN03540181

CPU : 667MHz

Certificate : C-Tick, CE/EMC.

1.2.2 Keyboard (PS2)

Manufacturer : HP

Model Number : SK-2506

Serial Number : C0006175364

Data Cable : Unshielded, undetachable, 1.7m.

Certificate : FCC DOC,CE/EMC.

1.2.3 Mouse (PS2)

Manufacturer : Logitech

Model Number : M-S43

Serial Number : LZA11801031

Data Cable : Unshielded, undetachable, 1.9m.

Certificate : FCC ID:DZL211106, CE/EMC,
VCCI, C-Tick (N231).

1.2.4 Printer

Manufacturer : HP
Model Number : C3990A
Serial Number : JPZX020487
Data Cable : Unshielded, detachable, 1.5m
Certificate : GS, CE, C-Tick, FCC DoC

1.2.5 Modem

Manufacturer : Aceex
Model Number : 1414
Serial Number : 980013576
Data Cable : Unshielded, Detachable, 1.8m
FCC ID : IFAXDM1414

1.3 Description of Test Facility

Site Description : Sept. 17, 1998 file on
(Semi-Anechoic Chamber) Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046, USA

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F 34Bldg 680 Guiping Rd,
Caohejing Hi-Tech Park,
Shanghai, China 200233

NVLAP Lab Code : 200371-0

1.4 Measurement Uncertainty

Conducted Emission Uncertainty : $U=\pm 2.66\text{dB}$
Radiated Emission Uncertainty : $U=\pm 4.26\text{dB}$

2 CONDUCTED EMISSION TEST

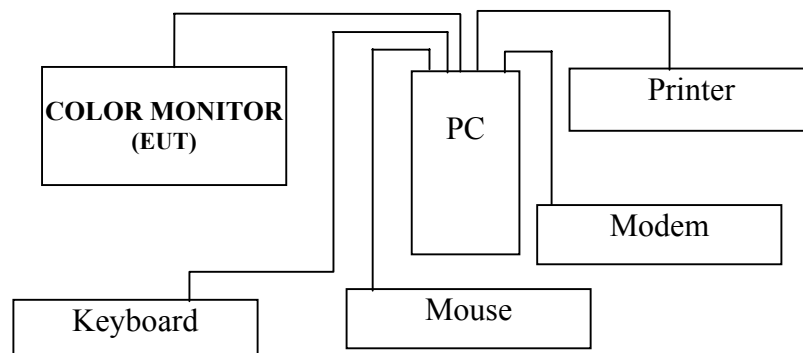
2.1 Test Equipment

The following test equipment are used during the conducted emission test in a shielded room:

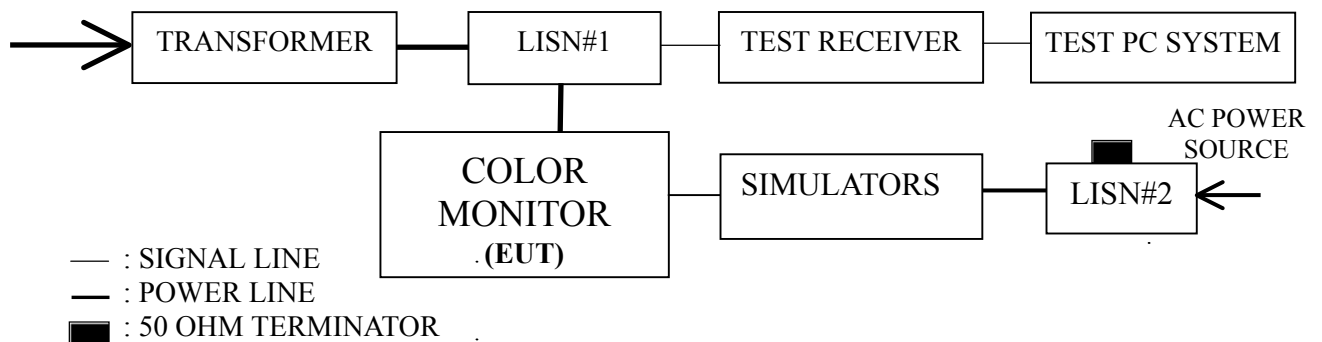
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	844077/020	Apr 20, 2004	1 Year
2.	Line Impedance Stabilization Network (LISN#1)	Kyoritsu	KNW-407	8-1280-4	Apr 20, 2004	1 Year
3.	Line Impedance Stabilization Network (LISN#2)	Kyoritsu	KNW-407	8-1280-5	Apr 27, 2004	1 Year
4.	50Ω Coaxial Switch	Anritsu	MP59B	M73389	Mar 21, 2004	1/2 Year
5.	50Ω Terminator	No.26 Factory	BNC	No.1	Mar 11, 2004	1/2 Year
6.	Software	Audix	E3	SET00200 9804M592	-	-

2.2 Block Diagram of Test Setup

2.2.1 EUT & Supported Simulators



2.2.2 Conducted Disturbance Test Setup



2.3 Conducted Emission Limit

Frequency Range (MHz)	Limits dB(μV)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50
NOTE 1 – The lower limit shall apply at the transition frequencies. NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz NOTE 3 – If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.		

2.4 Test Configuration

The EUT (listed in Sec.1.1) and the simulators (listed in Sec1.2) were installed as shown on Sec.2.2 to meet FCC requirement and operating in a manner which tends to maximize its emission level in a normal application.

2.5 Operating Condition of EUT

- 2.5.1 Setup the EUT and simulators as shown in Sec. 2.2
- 2.5.2 Turn on the power of all equipment and the EUT.
- 2.5.3 Set the contrast control to maximum.
- 2.5.4 Set the brightness control to maximum or at raster extinction if raster extinction occurs at less than maximum brightness.
- 2.5.5 For color monitors, use white letters on a black background to represent all color.
- 2.5.6 Select the worse case of positive or negative video if both alternatives are available.
- 2.5.7 Set character size and number of characters per line so that typically the greatest number of characters per screen is displayed.
- 2.5.8 For monitors with graphics capabilities, a pattern consisting of all scrolling Hs should be displayed. For monitors with text only capability, a pattern consisting of random text shall be displayed. If neither of the above apply, use a typical display.
- 2.5.9 Set the EUT on the test mode, and then test.

2.6 Test Procedures

The EUT was connected to the power mains through a Line Impedance Stabilization Network (LISN). This provided a 50 ohm coupling impedance for the measuring equipment.

Both sides of AC line (VA & VB) were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed or manipulated according to FCC Part 15 during conducted emission test.

The bandwidth of Test Receiver ESHS10 was set at 10 kHz.

The frequency range from 150 kHz to 30 MHz was checked.

The test modes (800*600 75Hz, 1024*768 85Hz, 1280*1024 60Hz) were done on conducted disturbance test and all the test results are listed in Sec. 2.7.

2.7 Test Results

< PASS >

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits.

The worse case is for 1280*1024 60Hz mode. The worst emission is detected at 1.601 MHz with corrected signal level of 47.70 dB(μ V) (limit is 56.00 dB(μ V)), when the VB (QP) of the EUT is connected to LISN.

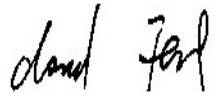
EUT : Color Monitor Temperature : 23°C

Model No. : T17LM-* Humidity : 56%

Serial No. : 44TAE26490238

Test Mode : 800*600 75Hz Date of Test : June 30, 2004

Test Line	Frequency (MHz)	Factor (dB)	Meter Reading dB(μV)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)
VA	0.186	0.22	43.74	43.96	64.20	20.24
	1.502	0.13	43.79	43.92	56.00	12.08
	1.636	0.14	45.17	45.31	56.00	10.69
	1.868	0.15	40.46	40.61	56.00	15.39
	22.169	0.94	45.20	46.14	60.00	13.86
	25.591	0.96	47.19	48.15	60.00	11.85
VB	0.185	0.23	42.55	42.78	64.24	21.46
	1.545	0.19	44.88	45.07	56.00	10.93
	1.725	0.20	45.08	45.28	56.00	10.72
	1.868	0.21	40.94	41.15	56.00	14.85
	22.180	0.78	46.14	46.92	60.00	13.08
	25.596	0.88	45.26	46.14	60.00	13.86
NOTE 1 - Probe Factor means insertion loss of LISN. NOTE 2 - Factor = Cable Loss + Probe Factor. NOTE 3 - Emission Level = Meter Reading + Factor. NOTE 4 - All reading are Quasi-Peak Values.						

TEST ENGINEER: 
(CLOUD FENG)

EUT : Color Monitor Temperature : 23°C

Model No. : T17LM-* Humidity : 56%

Serial No. : 44TAE26490238

Test Mode : 1024*768 85Hz Date of Test : June 30, 2004

Test Line	Quasi-peak /Average	Frequency (MHz)	Factor (dB)	Meter Reading dB(μV)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)
VA	QP	0.204	0.22	45.17	45.39	63.45	18.06
		1.513	0.13	45.91	46.04	56.00	9.96
		1.648	0.14	46.38	46.52	56.00	9.48
		1.918	0.15	42.51	42.66	56.00	13.34
		20.814	0.93	46.17	47.10	60.00	12.90
		23.006	0.94	47.57	48.51	60.00	11.49
	AV	1.513	0.13	33.19	33.32	46.00	12.68
		1.648	0.14	34.53	34.67	46.00	11.33
VB	QP	0.206	0.21	45.50	45.71	63.36	17.65
		1.511	0.19	47.25	47.44	56.00	8.56
		1.646	0.20	46.50	46.70	56.00	9.30
		6.662	0.30	40.34	40.64	60.00	19.36
		23.006	0.81	45.81	46.62	60.00	13.38
		26.841	0.91	45.32	46.23	60.00	13.77
	AV	1.510	0.19	35.86	36.05	46.00	9.95
		1.648	0.20	35.68	35.88	46.00	10.12
NOTE 1 - Probe Factor means insertion loss of LISN. NOTE 2 - Factor = Cable Loss + Probe Factor. NOTE 3 - Emission Level = Meter Reading + Factor.							

TEST ENGINEER: Cloud Feng
(CLOUD FENG)

EUT : Color Monitor Temperature : 23°C

Model No. : T17LM-* Humidity : 56%

Serial No. : 44TAE26490238

Test Mode : 1280*1024 60Hz Date of Test : June 30, 2004

Test Line	Quasi-peak /Average	Frequency (MHz)	Factor (dB)	Meter Reading dB(μV)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)
VA	QP	0.190	0.22	46.10	46.32	64.02	17.70
		0.256	0.18	41.24	41.42	61.56	20.14
		1.601	0.13	46.33	46.46	56.00	9.54
		1.664	0.14	46.94	47.08	56.00	8.92
		1.781	0.14	43.18	43.32	56.00	12.68
		22.650	0.94	46.40	47.34	60.00	12.66
	AV	1.597	0.13	35.01	35.14	46.00	10.86
		1.661	0.14	33.52	33.66	46.00	12.34
VB	QP	0.190	0.22	46.30	46.52	64.02	17.50
		1.403	0.19	44.09	44.28	56.00	11.72
		1.601	0.19	47.51	47.70	56.00	8.30
		1.781	0.20	44.33	44.53	56.00	11.47
		22.649	0.80	47.81	48.61	60.00	11.39
		26.418	0.90	48.10	49.00	60.00	11.00
	AV	1.598	0.19	36.05	36.24	46.00	9.76
	NOTE 1 - Probe Factor means insertion loss of LISN. NOTE 2 - Factor = Cable Loss + Probe Factor. NOTE 3 - Emission Level = Meter Reading + Factor.						

TEST ENGINEER: Cloud Feng
(CLOUD FENG)

3 RADIATED EMISSION TEST

3.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

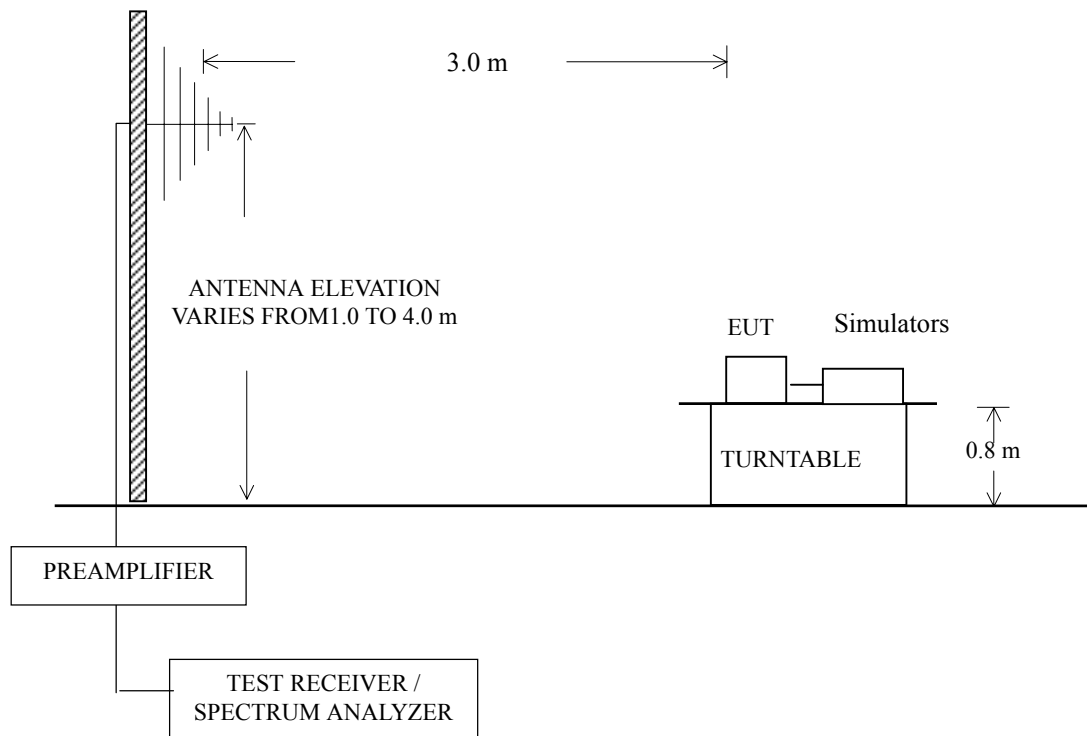
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	HP	8593EM	3628A00167	Apr 22, 2004	1 Year
2.	Bilog Antenna	Chase	CBL6111	1145	Mar 20, 2004	1/2 Year
3.	Test Receiver	Rohde & Schwarz	ESVS10	832699/004	Apr 26, 2004	1 Year
4.	Preamplifier	HP	8447D	2944A06849	Mar 22, 2004	1/2 Year
5.	50Ω Coaxial Switch	Anritsu	MP59B	M74689	Mar 21, 2004	1/2 Year
6.	Software	Audix	E3	SET00200 9912M295-2	-	-

3.2 Block Diagram of Test Setup

3.2.1 EUT and simulators

Same as Sec.2.2

3.2.2 Radiated emission test setup



3.3 Radiated Emission Limit

Frequency (MHz)	Distance (m)	Field strength limits (μV/m)	
		(μV/m)	dB(μV/m)
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
NOTE 1 - Emission Level dB(μV/m) = 20 log Emission Level (μV/m) NOTE 2 - The tighter limit applies at the band edges. NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.			

3.4 Test Configuration

The configuration of the EUT and simulators are same as those used in conducted emission test.

Please refer to Sec.2.4.

3.5 Operating Condition of EUT

Same as conducted emission test which is listed in Sec.2.5, except the test setup replaced by Sec.3.2.

3.6 Test Procedures

The EUT and simulators were placed on a turntable which is 0.8 meter above ground. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) was used as receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to FCC Part 15 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESVS10 was set at 120 kHz.

The frequency range from 30 MHz to 1000 MHz was checked.

The test modes (800*600 75Hz, 1024*768 85Hz, 1280*1024 60Hz) were done on radiated disturbance test and all the test results are listed in Sec.3.7.

3.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

The worse case is for 1024*768 85Hz mode. The worst emission at horizontal polarization was detected at 53.280 MHz with corrected signal level of 38.64 dB(μ V/m) (limit is 40.00 dB(μ V/m)), when the antenna was 1.40m height and the turn table was at 205°. The worst emission at vertical polarization was detected at 53.280 MHz with corrected signal level of 38.89 dB(μ V/m) (limit is 40.00 dB(μ V/m)), when the antenna was 1.00m height and the turn table was at 167°.

0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

The following are the frequencies which the measured result are below the specification limit by a margin less than the measurement uncertainty, it is not therefore possible to determine compliance at a level of confidence of 95%. However, the measured result indicates a higher probability that the product tested complies with the specification limit.

Test Mode	Antenna Polarization	Frequency (MHz)
800*600 75Hz	Horizontal	53.280, 756.530
	Vertical	53.280, 756.530
1024*768 85Hz	Horizontal	53.280, 756.530
	Vertical	53.280, 756.530
1280*1024 60Hz	Horizontal	53.280, 72.680, 756.530, 895.240
	Vertical	53.280, 72.680, 756.530

EUT : Color Monitor Temperature : 20.7°C

Model No. : T17LM-* Humidity : 53%

Serial No. : 44TAE26490238

Test Mode : 800*600 75Hz Date of Test : July 7, 2004

Polarization	Frequency (MHz)	Meter Reading dB(μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB(μV/m)	Limits dB(μV/m)	Margin (dB)
Horizontal	53.280	56.71	7.59	1.02	27.52	37.80	40.00	2.20
	145.430	44.97	11.13	1.83	27.06	30.87	43.50	12.63
	193.930	45.98	9.99	2.14	26.40	31.71	43.50	11.79
	487.840	37.42	19.49	3.72	27.09	33.54	46.00	12.46
	756.530	42.99	23.24	4.81	26.69	44.35	46.00	1.65
	895.240	39.39	22.43	5.37	26.11	41.08	46.00	4.92
Vertical	53.280	57.33	7.59	1.02	27.52	38.42	40.00	1.58
	126.030	42.05	12.40	1.67	27.20	28.92	43.50	14.58
	211.390	43.92	10.36	2.23	26.55	29.96	43.50	13.54
	756.530	42.18	23.24	4.81	26.69	43.54	46.00	2.46
	866.140	38.95	22.46	5.14	26.27	40.28	46.00	5.72
	895.240	39.48	22.43	5.37	26.11	41.17	46.00	4.83

NOTE 1 - Probe Factor means antenna factor.

NOTE 2 - Emission Level = Meter Reading + Antenna Factor + Cable Loss – Preamp Factor.

NOTE 3 - Factor = Probe Factor + Cable Loss - Preamp Factor.

NOTE 4 - All reading are Quasi-Peak values.

TEST ENGINEER: Cloud Feng
(CLOUD FENG)

EUT : Color Monitor Temperature : 20.7°C

Model No. : T17LM-* Humidity : 53%

Serial No. : 44TAE26490238

Test Mode : 1024*768 85Hz Date of Test : July 7, 2004

Polarization	Frequency (MHz)	Meter Reading dB(μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB(μV/m)	Limits dB(μV/m)	Margin (dB)
Horizontal	53.280	57.55	7.59	1.02	27.52	38.64	40.00	1.36
	245.340	47.31	11.68	2.45	26.24	35.20	46.00	10.80
	269.590	46.61	13.13	2.58	26.08	36.24	46.00	9.76
	324.880	42.09	15.95	2.91	26.29	34.66	46.00	11.34
	756.530	42.01	23.24	4.81	26.69	43.37	46.00	2.63
	829.280	37.83	22.50	5.00	26.75	38.58	46.00	7.42
Vertical	53.280	57.80	7.59	1.02	27.52	38.89	40.00	1.11
	72.680	52.70	7.15	1.26	27.50	33.61	40.00	6.39
	473.290	39.22	19.36	3.65	27.25	34.98	46.00	11.02
	676.990	37.34	23.60	4.50	26.68	38.76	46.00	7.24
	756.530	41.55	23.24	4.81	26.69	42.91	46.00	3.09
	897.180	38.56	22.42	5.42	26.11	40.29	46.00	5.71
NOTE 1 - Probe Factor means antenna factor. NOTE 2 - Emission Level = Meter Reading + Antenna Factor + Cable Loss – Preamp Factor. NOTE 3 - Factor = Probe Factor + Cable Loss - Preamp Factor. NOTE 4 - All reading are Quasi-Peak values.								

TEST ENGINEER: Cloud Feng
(CLOUD FENG)

EUT : Color Monitor Temperature : 20.7°C

Model No. : T17LM-* Humidity : 53%

Serial No. : 44TAE26490238

Test Mode : 1280*1024 60Hz Date of Test : July 7, 2004

Polarization	Frequency (MHz)	Meter Reading dB(μ V)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB(μ V/m)	Limits dB(μ V/m)	Margin (dB)
Horizontal	53.280	55.63	7.59	1.02	27.52	36.72	40.00	3.28
	72.680	55.28	7.15	1.26	27.50	36.19	40.00	3.81
	261.830	51.63	12.65	2.56	26.42	40.42	46.00	5.58
	324.880	46.95	15.95	2.91	26.29	39.52	46.00	6.48
	756.530	43.43	23.24	4.81	26.69	44.79	46.00	1.21
	895.240	40.69	22.43	5.37	26.11	42.38	46.00	3.62
Vertical	53.280	57.75	7.59	1.02	27.52	38.84	40.00	1.16
	72.680	57.34	7.15	1.26	27.50	38.25	40.00	1.75
	126.030	47.14	12.40	1.67	27.20	34.01	43.50	9.49
	478.140	45.60	19.41	3.65	27.38	41.28	46.00	4.72
	756.530	43.13	23.24	4.81	26.69	44.49	46.00	1.51
	895.240	38.20	22.43	5.37	26.11	39.89	46.00	6.11
NOTE 1 - Probe Factor means antenna factor. NOTE 2 - Emission Level = Meter Reading + Antenna Factor + Cable Loss – Preamp Factor. NOTE 3 - Factor = Probe Factor + Cable Loss - Preamp Factor. NOTE 4 - All reading are Quasi-Peak values.								

TEST ENGINEER: Cloud Feng
(CLOUD FENG)

4 DEVIATION TO TEST SPECIFICATIONS

The following components are used during the countermeasure procedures:

Name	Model Number	Specifications (mm)			Manufacturer	Location
		Length	Internal diameter	External diameter		
Magnetic core	125-074E	12.0±0.7	9.6±0.3	18.4±0.4	BOAM Co., Ltd.	See Appendix II Figure3, 4, 6
Magnetic core	70-1601708001	17.0±0.5	8.0±0.3	16.0±0.5	URITE&EQ Co., Ltd.	See Appendix II Figure3, 4, 6
Magnetic core	125-074K	15.0±0.5	6.9±0.3	13.9±0.3	BOAM Co., Ltd. HAENG SUNG Co., Ltd.	See Appendix II Figure3, 4, 6
Magnetic core	125-074J	28.2±0.8	9.5±0.4	18.2±0.5	FEELUX Co., Ltd BOAM R&D Co., Ltd.	See Appendix II Figure3, 4, 6
Note: The Manufacturer had to add the magnetic cores to the cables in the production of this EUT in order that complies with the limits.						