

EMC TEST REPORT

No. JSH006040946-001

Applicant	:LG Electronics USA 1000 Sylvan Avenue, Englewood Cliffs, NJ07632, USA
Manufacturer	: LG-Tontru Colour Display System Co., Ltd. No. 346, Yaixin Road Economic&Technical Development Zone Nanjing China.
Equipment	:Color Monitor
Type/Model	: T70BQ

Summary

The equipment comply with the requirements according to the following standard(s):

47CFR Part 15 (2006): Radio Frequency Device

ANSI C63.4 (2003): Interim Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.

Description

The appliances were tested by Shanghai Institute of Process Automation Instrumentation and found compliance with relevant requirements described in FCC Part 15 Radio frequency Device.

Test results are contained in this test report and Intertek Testing Services ETL SEMKO Shanghai Limited is assumed full responsibility for the accuracy and completeness of these measurements.

The test report applies to tested samples only and shall not be reproduced in part without written approval of Intertek Testing Services ETL SEMKO Shanghai Limited.

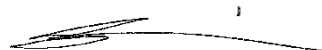
Date of issue: April 26, 2006

Prepared by:



Daniel Zhao (*Project engineer*)

Approved by:



Steve Li(*Reviewer*)

Content

SUMMARY	1
DESCRIPTION	1
CONTENT	2
1.GENERAL INFORMATION	3
1.1 Description of Equipment Under Test (EUT)	3
1.2 Description of Client	3
1.3 Description of Test Facility	3
2.TEST SPECIFICATIONS	4
2.1 Standards	4
2.2 Mode of operation during the test / Test peripherals used	4
2.3 Instrument list	4
2.4 Test software	6
2.5.Test Summary	7
EMISSION TEST	8
3. MAINS DISTURBANCE VOLTAGE	8
3.1 Limits of disturbance	8
3.1.1 Limits of disturbance voltage at the mains terminals	8
3.2.1 set up at mains terminal	8
3.3 Test Setup and Test Procedure	9
3.4 Test Protocol	10
3.5 Measurement Uncertainty	11
3.6 Additions, Deviations and Exclusions from Standards	11
4. RADIATED EMISSION	12
4.1 Radiated emission limit from frequency range 30MHz – 1000MHz	12
4.2 Block diagram and test set up	12
4.3 Test Protocol	13
4.4 Measurement uncertainty	13
4.5 Additions, Deviations and Exclusions from Standards	13

1. GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

EUT	:	Color Monitor
Description of EUT	:	None.
Model number	:	T70BQ
FCC ID	:	BEJT70BQ
Rating	:	100 – 240V~, 50/60HZ, 69W
Mains lead	:	1.2 m
Data cable	:	VGA Line (shielded, with a core).
Date of test	:	May 25 – 27, 2006

1.2 Description of Client

Applicant	:	LG Electronics USA 1000 Sylvan Avenue, Englewood Cliffs, NJ07632, USA
Name of contact:		Mr. Daniel Kim
Telephone:		+1-847-941-8373
Telefax:		+1-847-941-8484
Manufacturer	:	LG-Tontru Colour Display System Co., Ltd. No. 346, Yaoxin Road Economic&Technical Development Zone Nanjing China.

1.3 Description of Test Facility

Name: Intertek Testing Services Limited Shanghai

Address: Building No.86, 1198 Qinzhou Road(North), Shanghai 200233, P.R. China

FCC Registration Number: 236597

Name of contact: Steve Li

Tel: +86 21 64956565 ext. 214

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2.TEST SPECIFICATIONS

2.1 Standards

47CFR Part 15 (2006): Radio Frequency Device

ANSI C63.4 (2003): Interim Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz.

2.2 Mode of operation during the test / Test peripherals used

The EUT was set to 1024X768, 85 Hz, and the screen was full of scrolling 'H' letter.

The contrast and brightness were set to maximum

There are 45(row) X130 (column) 'H' letter on the screen. Each letter is about 5mm X 2.4mm.

Test peripherals:

Equipment	Model	S/N	Manufacturer
PC	Hp Compaq d330uT	CNG40607T7	HP
Keyboard	Y-BP62a	867604-0403	Logitech
Mouse	3D optical mouse	/	Xing Long
Printer	HP DESKJET 3820	CN271191C3	HP
Modem	DM-1414	0102027542	Aceex Corporation

2.3 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2006-2-9	2007-2-8
Test Receiver	ESIB 26	R&S	EC 3045	2005-7-1	2006-6-30
Voltage Probe	ESH2-Z3	R&S	EC 2107-1	2006-2-9	2007-2-8
A.M.N.	ESH2-Z5	R&S	EC 3119	2006-2-9	2007-2-8
A.M.N.	ESH3-Z5	R&S	EC 2109	2006-2-9	2007-2-8
I.S.N.	ENY 22	R&S	EC 3218	2006-2-9	2007-2-2
I.S.N.	ENY 41	R&S	EC 3220	2006-2-9	2007-2-8
Current probe	EZ-17	R&S	EC 3221	2006-2-9	2007-2-8
Absorbing clamp	MDS 21	R&S	EC 2108	2006-2-9	2007-2-8
Click meter	CL55C	AFJ	EC 2253	2005-8-22	2006-8-21
Harmonic-flicker system	5001ix-PACS-1	CI	EC 2110	2006-2-9	2007-2-8
Conduct immunity system	UCS 500M6B	EM TEST	EC 2958	2006-2-9	2007-2-8
Automatic transformer	MV2616	EM TEST	EC 2957	Not required	Not required
Capacity clamp	HFK	EM TEST	EC 2959	Not required	Not required

ESD generator	ditto	EM TEST	EC 2956	2006-2-10	2007-2-9
Surge generator	TSS 500M4	EM TEST	EC 2961	2006-2-9	2007-2-8
Surge generator	TSS 500M2F	EM TEST	EC 2960	2006-2-9	2007-2-8
Surge Coupling network	CNV 504M	EM TEST	EC 2958-2	2006-2-9	2007-2-8
Surge Coupling network	CNV 504S1	EM TEST	EC 2958-1	2006-2-9	2007-2-8
Induction coil/generator	INA 701	Schaffner	EC 2114	2004-7-18	2006-7-17
Signal generator	SML 01	R&S	EC 2338	2006-2-9	2007-2-8
Power amplifier	75A250	AR	EC 3043-1	2005-8-22	2006-8-21
CDN	CDN M216	Schaffner	EC 2113-2	2005-3-24	2007-3-23
CDN	CDN M316	Schaffner	EC 2113-1	2005-3-24	2007-3-23
CDN	CDN T2	EM TEST	EC 3043-2	2006-2-9	2007-2-8
CDN	CDN T4	EM TEST	EC 3043-4	2006-2-9	2007-2-8
EM clamp	EM 101	EM TEST	EC 3043-6	2005-8-22	2006-8-21
Power meter	PM2002	AR	EC3043-7	2006-2-9	2007-2-8
Power sensor	PH2000	AR	EC3043-8	2006-2-9	2007-2-8
Attenuator	ATT6/75	EM TEST	EC 3043-3	2006-2-9	2007-2-8
Attenuator	68-6-44	Weinschel	EC 3043-9	2006-3-3	2007-3-2
DDC	DC 2600	AR	EC 3043-5	2006-2-13	2007-2-12
DDC	DC 6180A	AR	EC 3044-5	2006-2-13	2007-2-12
DDC	DC 7144A	AR	EC 3044-6	2006-2-13	2007-2-12
Calibration Impedance	50	AR	EC 3043-12	2006-2-9	2007-2-8
Calibration Impedance	R100	AR	EC 3043-10	2006-2-9	2007-2-8
Calibration Impedance	R100	AR	EC 3043-11	2006-2-9	2007-2-8
Calibration Impedance	CAL U100A	Schaffner	EC 2113-3	2005-3-24	2007-3-23
Calibration Impedance	TRA U150	Schaffner	EC 2113-4	2005-3-24	2007-3-23
Ultra-broadband antenna	HL 562	R&S	EC 3046-1	2005-7-1	2006-6-30
Horn antenna	HF 906	R&S	EC 3049	2005-7-1	2006-6-30
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2005-7-1	2006-6-30
Log-period antenna	AT 1080	AR	EC 3044-7	2005-8-22	2006-8-21
Horn antenna	AT 4002	AR	EC 3044-8	2005-8-22	2006-8-21
Signal generator	SMR 20	R&S	EC 3044-1	2005-8-22	2006-8-21
Power amplifier	150W1000	AR	EC 3044-2	2005-8-22	2006-8-21
Power amplifier	25S1G4	AR	EC 3044-4	2005-8-22	2006-8-21
Field meter	FM 5004	AR	EC 3044-3	2005-8-22	2006-8-21
Field sensor	FP 6001	AR	EC 3044-9	2005-8-22	2006-8-21
Semi-anechoic chamber	-	Albatross project	EC 3048	2005-6-27	2006-6-26

Fully-anechoic chamber	-	Albatross project	EC 3047	2005-6-27	2006-6-26
Spectrum analyzer	E7402A	Agilent	EC 2254	2005-8-2	2006-8-1
Digital illuminance meter	TES 1332	TES	EC 2451	2005-6-16	2006-6-15
Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3323	2005-12-28	2006-12-27
Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3324	2006-2-14	2007-2-13
Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2005-12-28	2006-12-27
Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3326	2005-12-28	2006-12-27
Pressure meter	YM3	Shanghai Mengde	EC 3320	2006-2-17	2008-2-16
Isolation transformer	-	Intertek	EC 2100	Not required	Not required
Stable power source	APS 11020	APC	EC 3209	Not required	Not required
Freq. Variable power source	AFC 11010	APC	EC 3210	Not required	Not required
Freq. Variable power source	AFC 33020	APC	EC 3211	Not required	Not required
Multi-meter	179	FLUKE	EC 3326	2005-8-3	2006-8-2
Shielded room	-	Zhongyu	EC 2838	2004-2-3	2009-2-2
Shielded room	-	Zhongyu	EC 2839	2004-2-3	2009-2-2

2.4 Test software

Test software	Type	Manu.	Version	Cal. Date	Due date
Software of disturbance voltage	EsxS-K1	R&S	Version 2.10	2006-2-9	2007-2-8
Software of Radiated emission	ES-K1	R&S	Version 1.71	2005-7-1	2006-6-30

2.5. Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	RESULT	NOTE
Mains terminal continuous disturbance voltage	Pass	
Radiated emission	Pass	

Notes: 1: NA =Not Applicable

Emission Test

3. Mains Disturbance Voltage

Test result: Pass

3.1 Limits of disturbance

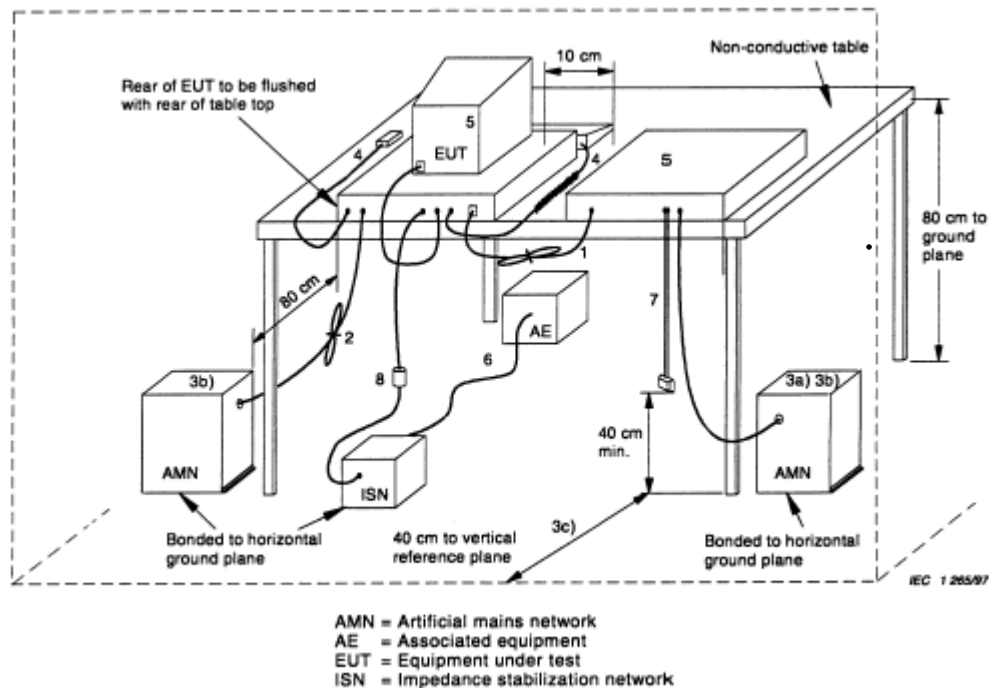
3.1.1 Limits of disturbance voltage at the mains terminals

Frequency range (MHz)	Limits dB(μ v)	
	Quasi-peak	Average
0.15 ~ 0.5	66 ~ 56 *	56 ~ 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

Note : 1. * means the limit decreasing linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz
2. If the limit for the measurement with the average detector is met when using a receiver with a quasi-peak detector, the equipment under test shall be deemed to meet both limits and the measurement using the receiver with an average detector need not be carried out.

3.2 Block diagram of test set up

3.2.1 set up at mains terminal



3.3 Test Setup and Test Procedure

The EUT was set to achieve the maximum emission level.

The mains terminal disturbance voltage was measured with the EUT in a shielded room.

The EUT was connected to AC power source through an Artificial Mains Network which provide a 50 Ω linear impedance artificial hand is used if appropriate.

The load/control terminal disturbance voltage was measured with passive voltage probe.

For **Table top** ☒

The EUT was placed on a 0.8m high non-metallic table above a metallic plane, The wall of shielded room used as Ground Reference Plane (GRP)

For **Floor standing** ☐

The EUT was placed on a 0.1m high non-metallic support above a metallic plane, The wall of shielded room used as Ground Reference Plane (GRP)

For Both Table Top and Floor Standing

The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver ESCS 30 was set at 9kHz.

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

Amplitude measurements were performed with a quasi-peak detector and, if necessary, with an Average detector.

3.4 Test Protocol

Temperature : 20°C

Relative Humidity : 40%

Frequency (MHz)	Line (L/N)	Factor (dB)	Quasi-peak		Average	
			Disturbance level dB(uV)	Permitted limit dB(uV)	Disturbance level dB(uV)	Permitted limit dB(uV)
0.21	L	0.78	56.93	63.35	49.33	53.35
0.27	L	0.78	49.88	60.99	43.63	50.99
0.34	L	0.79	47.17	59.14	43.36	49.14
0.41	L	0.81	43.77	57.61	39.09	47.61
0.76	L	0.64	42.72	56.00	38.59	46.00
1.23	L	0.63	43.24	56.00	40.05	46.00
1.64	N	0.61	42.09	56.00	37.42	46.00
4.26	L	0.58	40.60	56.00	39.72	46.00

Note: Since the test software will automatically add the LISN transducer and cable loss to the reading level, only the emission level was listed in the test report.

3.5 Measurement Uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with CISPR 16-4: 2002.

Measurement uncertainty of mains terminal disturbance voltage : $\pm 3.6\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

3.6 Additions, Deviations and Exclusions from Standards

None.

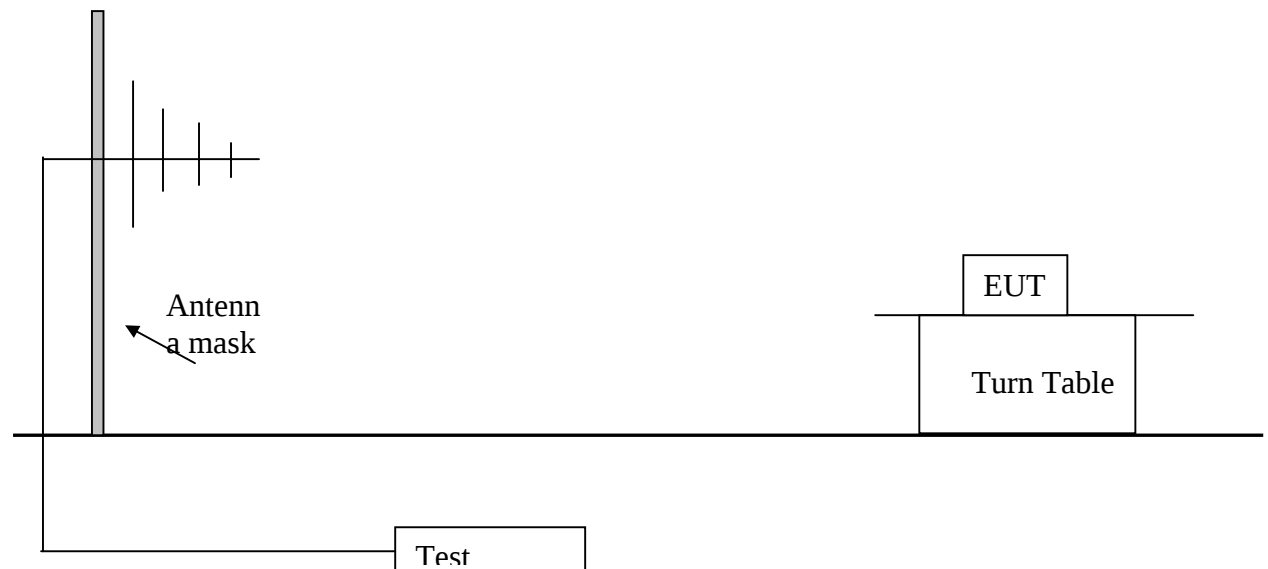
4. Radiated emission

Test result: PASS

4.1 Radiated emission limit from frequency range 30MHz – 1000MHz

Frequency of emission (MHz)	Field Strength (microvolts/meter)	Field strength (dB μ V/m)
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0
Radiated emission in dB μ V/m = 20lg (microvolts/meter)		

4.2 Block diagram and test set up



The measurement was applied in an semi-anchonic chamber.

The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. 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 that was mounted on an antenna mask. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

Broadband antenna was used as receiving antenna. Both horizontal and vertical polarization of the antenna was set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to EN55022 requirement during radiated test.

The bandwidth setting on R&S Test Receiver ESI26 was 120kHz.

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

4.3 Test Protocol

Temperature: 20°C Relative humidity: 40%

Frequency (MHz)	Factor (dB)	Ant. Pol. (H/V)	Emission level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
55.69	7.2	V	31.30	40.0	8.7
70.82	7.2	H	31.70	40.0	8.3
94.15	9.9	V	38.35	43.5	5.1
117.47	10.9	H	36.40	43.5	7.1
164.13	9.3	H	35.90	43.5	7.6
191.34	9.5	H	34.70	43.5	8.8
496.53	18.4	V	38.40	46.0	7.6

Note: 1. Since the test software will automatically add the LISN transducer and cable loss to the reading level, only the emission level was listed in the test report.

2. Margin (dB) = Limit – Emission level

Example: 35.38MHz

Margin (dB)= limit – Emission level = 40.0 – 38.25 = 1.75 dB.

4.4 Measurement uncertainty

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

Measurement uncertainty is calculated in accordance with CISPR 16-4: 2002.

Measurement uncertainty of mains terminal disturbance voltage: $\pm 5.2\text{dB}$

The measurement uncertainty is given with a confidence of 95%, $k=2$.

4.5 Additions, Deviations and Exclusions from Standards

None