# VERIFICATION REPORT

**LG Electronics Inc.**
**19-1, Cheongho-Ri, Jinwuy-Myon**
**Pyungtaeak-Shi, Kyunggi-Do, KOREA**

**Date of Tests : June 17th. 2005**
**Test Reports S/N: DMST050610-YG**

| | | |
|---|---|---|
| **Trade Name** | **:** | **LG** |
| **Model** | **:** | **LCC-K1000** |
| **M/L Model** | **:** | **LKD1000** |
| **EUT Type** | **:** | **DYNAMIC CAM CONTROLLER** |
| **Rule Part(s)** | **:** | **FCC Part 15 CLASS B** |

**This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.4-2001 (Note Code #37).**

**I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for qualifications of all persons taking them.**

***P.T. R&D Lab. Certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S. C. 853(a)***

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**June 10th, 2005**
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**LG Electronics Inc.**

# Introduction

## 1. Test Specification, Method & procedures

To determine the Radiated and Conducted Emission emanating from
LG Electronics Inc.
The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40 GHz (ANSI C63.4-2001)was used.

## 2. Location of testing facility

It takes about an hour from Seoul by car. The distance is approximately 50km.


Note: The detailed description of measuring facility was found to be in compliance with Federal Communications Commission requirements of §2.948 according to ANSI 63.4

# Description of Test

## Conducted Emission

The measurement for power line conducted emissions from EUT was made in 9m x 6m x 3m shielded enclosure manufactured by LINDGREN RF ENCLOSURES. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-6.

The EUT was placed on 1m. x 1.5m. Wooden table 80cm. High which is placed on the earth-grounded conducting surface larger than 2 square-meter. The vertical conducting surface was located 40Cm to the EUT.

During conducted emissions measurement, The receiver (ESCS30, Rohde & Schwarz) that has a CISPR quasi-peak detector with 9 KHz bandwidth of 6 dB was utilized and scanned from 450 kHz to 30 MHz.

Kyoritsu Model KNW-407 and EMCO Model 3725/2 (10KHz-30MHz) 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room. The EUT is powered from the Kyoritsu LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by LINDGREN shielded enclosure filter (120dB 150KHz-1GHz).
If the EUT is a DC-powered device, power will be driver from the source power supply it normally will be powered from and this supply lines will be connected to the Kyoritsu LISN.

All interconnecting cables more than 1 meter were shortened by non -inductive bundling back-and -forth form to a 1-meter length. Sufficient time for the EUT, support equipment,and test equipment was allowed the frequency producing the maximum EME from the EUT.
The EUT, support equipment,and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Each EME reported was calibrated using internal signal generator.

## Radiated Emission

Preliminary measurements were performed in the 3m anechoic chamber using broadband antennas, EMI receiver (ESMI, Rohde & Schwarz) to determine the emissions characteristics of the EUT. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The receiver was scanned from 30 to 1000MHz using bi-log antenna. Above 1 GHz, a horn antenna is used.

Final measurements were made at 3-meter open area test site using broadband bi-log antenna in range of 30 - 1000 MHz.which is correlative to levels obtained with a tuned dipole antenna. For emissions above1000 MHz, horn antenna may be used. Measurements were also made for both horizontal and vertical polarization. The horizontal distance between the receiving antenna and the closest periphery of the EUT was 3 meters as described in 8.2.3 of ANSI C 63.4-2001.

Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field strength meter (ESVS30, Rohde & Schwarz) and the bandwidth of the receiver was set to 120kHZ or 1 MHz depending on the frequency or type of signal.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 80 Cm high non-metallic 1x 1.5 meter table. Each Type of accessory provided by manufacture or typical used and support equipment, and interconnecting cables were connected to the EUT during measurement to the typical usage and applicable nearly as practicable.

The turn table containing the system was rotated and antenna height was varied 1 to 4 meters to find worst-case emissions from EUT.
Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable, and changing the polarity of the antenna, whichever determined the worst-case emission. Each EME reported was calibrated using internal signal generator.

# Test Data

## Conducted Emissions

| *Test mode:Normal Operating Mode* | | | | |
|---|---|---|---|---|
| Frequency | Reading Value [dBμV] | Limit [dBμV] | Margin [dB] | Line |
| (MHz) | Q-peak | Q-peak | Q-peak | L1 / N |
| 0.563 | 28.8 | 56.0 | 27.2 | L1 |
| 0.602 | 30.7 | 56.0 | 25.3 | L1 |
| 0.624 | 30.4 | 56.0 | 25.6 | N |
| 0.653 | 29.9 | 56.0 | 26.1 | N |
| 0.831 | 28.4 | 56.0 | 27.6 | L1 |

Table 1. Conducted Emissions Measurements

***NOTES:***
***1. All modes of operations were investigated and worst- case emissions are reported.***

***2. Line L1 = HOT  Line N = Neutral***

# Test Data

## Radiated Emission

| *Test mode: Normal Operating Mode* | | | | |
|---|---|---|---|---|
| Frequency | Reading Value [dB$\mu$V/m] | Limit [dB$\mu$V/m] | Margin [dB] | POL |
| (MHz) | Q-peak | Q-peak | Q-peak | HOR / VER |
| 30.040 | 29.1 | 40.0 | 10.9 | HOR |
| 79.150 | 28.3 | 40.0 | 11.7 | HOR |
| 88.740 | 27.5 | 43.5 | 16.0 | VER |
| 178.240 | 29.6 | 43.5 | 13.9 | HOR |
| 472.620 | 34.2 | 46.0 | 11.8 | VER |

Table 2. Radiated Emissions Measurements

***NOTES:***
***1. All modes of operations were investigated and worst- case emissions are reported.***

# Test Equipment

| Type | Model | Cal. Date | S/N |
|---|---|---|---|
| EMI measurement system | R&S, ESMI | 08/29/05 | 846064/004 |
| Test receiver | R&S, ESVS30 | 07/05/05 | 842807/002 |
| Test receiver | R&S, ESCS30 | 07/05/05 | 100093 |
| Spectrum monitor | R&S, EZM | | 862304/008 |
| Spectrum monitor | R&S, EZM | | 862304/006 |
| Spectrum analyzer | HP8568B | 07/03/05 | 3107A01571 |
| Quasi-peak adaptor | HP85650A | 07/03/05 | 3107A01517 |
| RF Pre-selector | HP85685A | 07/03/05 | 3107A01237 |
| Pre-amplifier | HP8447F(BNC- type) | 07/03/05 | 2805A02879 |
| Pre-amplifier | HP8447F(N-type) | 07/01/05 | 3113A05259 |
| Pre-amplifier | HP8447C(N-type) | 07/03/05 | 1937A00732 |
| RF Signal Generator | Fluke, 6060B | 07/03/05 | 5655209 |
| IRE STD. Signal Generator | Shibasoku, VG40A | 03/03/06 | M-56221002 |
| TV CH. Signal Generator | Shibasoku, 363US | | M-14817005 |
| TV CH. Signal Generator | Shibasoku, 363VS | | M-12762002 |
| NTSC Pattern Generator | Leader, LCG-400 | 01/11/06 | 705008 |
| VITS Generator | Anritsu, MG318A | 10/03/05 | M11122 |
| VITS Generator | Anritsu, MG318A | 02/20/06 | M10478 |
| Tuned Dipole Antenna | EMCO, 3121C | 04/16/06 | 9160-620 |
| Tuned Dipole Antenna | EMCO, 3121C | 04/16/06 | 9160-621 |
| VHF Dipole Antenna | S/B, VHA9103 | | N/A |
| UHF Dipole Antenna | S/B, UHA9105 | | N/A |
| Bi-Log Antenna | Chase, CBL611A | 08/27/05 | 1838 |
| Bi-Log Antenna | Chase, CBL611 | 04/16/06 | 1235 |
| Biconical Antenna | S/B, BBA9106 | 07/02/05 | N/A |
| Biconical Antenna | S/B, BBA9106 | 07/02/05 | N/A |
| Log-periodic Antenna | S/B, UHAL9107 | 07/02/05 | N/A |
| Log-periodic Antenna | S/B, UHAL9107 | 07/02/05 | N/A |
| Horn Antenna | S/B, BBA 9102-B | | 106 |
| IEC-106 Antenna | HFU2-Z4 | | N/A |
| Absorbing Clamp | R&S, MDS21 | | 860846/004 |
| Absorbing Clamp | R&S, MDS21 | | 301116/072 |
| LISN | Kyoritsu, KNW-407 | 04/14/06 | 8-6555-4 |
| LISN | Shibasoku, 563 | | 55416001 |
| LISN | S/B, NSLK8126 | | 862770/013 |
| LISN | EMCO,3825/2 | 04/14/06 | |