HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

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CERTIFICATION

Manufacture;
LG Electronics Inc.

50 Hyangjeong-dong, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 361-480, Korea

LG ELECTRONICS FRN : 0012281820

Date of Issue : DECEMBER 30, 2004

Test Report No.: HCT-F04-1217

Test Site: HYUNDAI CALIBRATION & CERTIFICATION TECHNOLOGIES CO., LTD.
HCT FRN : 0005-8664-21

FCC ID : **SSNUBIU**

MODEL : **UBIU**

Rule Part(s):	**Part 15 & 2; ET Docket 95-19**
Equipment Class:	**FCC Class B Peripheral Device (JBP)**
Standard(s):	**FCC Class B: 1998 (CISPR 22)**
EUT Type:	**LG USB Drive**
Memory:	**128MB**
Read Write Speed:	**Read 8MB/sec, Write 6MB/sec**
Model(s):	**UBIU**
Port/Connector(s)	**USB Port**

This equipment has been shown to be in 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.

I attest to the accuracy of data. 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 the qualifications of all persons taking them.

Ki Soo Kim

Report prepared by : Ki-Soo Kim
Manager of EMC Tech. Part

TABLE OF CONTENTS

MEASUREMENT REPORT

1.1 Scope

Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

Applicant Name:	**LG Electronics Inc.**
Address:	**50 Hyangjeong-dong, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, 361-480, Korea**

- **FCC ID : SSNUBIU**
- Equipment Class: **FCC Class B Peripheral Device (JBP)**
- EUT Type: **LG USB Drive**
- Model(s): **UBIU**
- Read Write Speed: **Read 8MB/sec, Write 6MB/sec**
- Port(s): **USB Port**
- Memory: **128MB**
- System Requirements: **Windows 98/SE/ME/2000/XP**
  Mac OS 9.0 or later
  Linux Kernel 2.4.0 or later
- Power : **USB 1.1 and 2.0 compatible**
- Rule Part(s): **FCC Part 15 Subpart B**
- Test Procedure(s): **ANSI C63.4 (2001)**
- Dates of Tests: NOVEMBER 23, 2004 ~ NOVEMBER 27, 2004
- Place of Tests: 254-1,MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO,467-701,KOREA

2.1 INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSIC63.4-2001) was used in determining radiated and conducted emissions emanating from **LG Electronics Inc. LG USB Drive FCC ID : SSNUBIU**

The open area test site and conducted measurement facility used to collect the radiateddata are located at the 254-1, MAEKOK-RI,HOBUP-MYUN,ICHON-SI,KYOUNGKI-DO, 467-701,KOREA. The site is constructed in conformance with the requirements of ANSI C63.4and CISPR Publication 22. Detailed description of test facility was submitted to the Commissionand accepted dated July 23,2003 (Confirmation Number: EA90661)

3.1 PRODUCT INFORMATION

3.2 Equipment Description

The **UBIU** is a **LG USB Drive** made by **LG Electronics Inc**. in Korea. Refer to the user's manual for more information.

- **FCC ID : SSNUBIU**
- Equipment Class: **FCC Class B Peripheral Device (JBP)**
- EUT Type: **LG USB Drive**
- Model(s): **UBIU**
- Read Write Speed: **Read 8MB/sec, Write 6MB/sec**
- Port(s): **USB Port**
- Memory: **128MB**
- System Requirements: **Windows 98/SE/ME/2000/XP**
  Mac OS 9.0 or later
  Linux Kernel 2.4.0 or later
- Power : **USB 1.1 and 2.0 compatible**

4.1 Description of Tests(Conducted & Radiated)

4.1.1 Powerline Conducted Emission (150kHz- 30MHz)

The power line conducted RFI measurements were performed according to CISPR 22.
The EUT was placed on a non-conducting 1.0 by 1.5 meter table which is 0.8 meters in height and 0.40 meters away from the vertical wall of the shielded enclosure. Power to the EUT is provided through a Rohde & Schwarz 50 Ω / 50 uH Line Impedance Stabilization Network (LISN) and the support equipment through a separate Solar 50 Ω / 50 uH Line- Conducted Test Facility LISN. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME. The spectrum was scanned from 150kHz to 30 MHz. Each maximum EME was measured using an EMI receiver. The detector function of the receiver was set to CISPR quasi- peak and average mode with the bandwidth set to 9 kHz. Each emission was maximized consistent with the typical applications by varying the configuration of the test sample. Interface cables were connected to the available interface ports of the test unit. The effect of varying the position of cables was investigated to find the configuration that produces maximum Diagram emission. Excess cable lengths were bundled at the centre with 30- 40cm. in length. The worst-case configuration is noted in the test report and the photographs are attached. Each EME reported was calibrated using the Rohde & Schwarz SMX signal generator and are listed on Table 1. RFI Conducted FCC Class B

RFI CONDUCTED	FCC CLASS B Limits dB(uV/m)	
Freq. Range	CISPR 22 Quasi-Peak	CISPR 22 Average
150kHz - 0.5MHz	66-56*	56-46*
0.5MHz - 5MHz	56	46
5MHz - 30MHz	60	50
*Limits decreases linearly with the logarithm of frequency		

Table 1. FCC CLASS B Conducted Emission Limits

4.1.2 Description of Tests(Radiated)

Radiated Emissions

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The spectrum was scanned from 30 to 300 MHz using biconical antenna, 300 to 1000 MHz using log- periodic antenna, and above 1 GHz using linearly polarized horn antennas. Final measurements were made outdoors at 10-meter test range using Dipole antennas and EMI receiver. For frequencies above 1 GHz, horn antennas were used. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition. The EMI receiver detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120 kHz. The EUT, support equipment, and interconnecting cables were arranged to the configuration that produces the maximum EME emission found during preliminary scan. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Horizontal and vertical antenna polarizations were checked. 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 the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

ITE Radiated Limits			
Frequency (MHz)	**FCC Limit @ 3m. Quasi-Peak dB[μV/m]**	**FCC Limit @ 10m.* Quasi – Peak dB [μV/m]**	**CISPR Limit @ 10m. Quasi-Peak dB [μV/m]**
30-88	**40.0**	**29.5**	**30.0**
88-216	**43.5**	**33.0**	**30.0**
216-230	**46.0**	**35.6**	**30.0**
230-960	**46.0**	**35.6**	**37.0**
960-1000	**54.0**	**43.5**	**37.0**
> 1000	**54.0**	**43.5**	**43.5**
*** Limit extrapolated 20 dB/decade**			

Table 2. Radiated Class B limits @ 10-meters

5.1 Support Equipment Used

DEVICE TYPE	MANUFACTURER	MODEL NUMBER	FCC ID / DoC	CONNECTED TO
LG USB Drive (EUT)	LG Electronics Inc.	UBIU	SSNUBIU	P.C
P.C	HCT	DP-109	DoC	EUT
MONITOR	CORNEA	CT1700	DoC	P.C
MONITOR ADAPTOR	D-TECH	DTA-XGA02	DoC	MONITOR
KEY BOARD	H.P	5181	DoC	P.C
MOUSE	Microsoft	IntelliMouse optical USB and PS/2 compatible	DoC	P.C
SERIAL MOUSE	LOGITECH	M-M35	DoC	P.C
PRINTER	H.P	C4569A	DoC	P.C

5.2 Cable Description

	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
LG USB Drive	N/A	N/A	-
PC	N	N/A	1.8(P)
MONITOR	N	Y	1.8(P),1.5(D)
KEY BOARD	N/A	Y	1.8(D)
MOUSE	N/A	Y	1.8(D)
PRINTER	N	Y	1.8(P),1.8(D)
SERIAL MOUSE	N/A	Y	1.6(D)

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

5.3 Noise Suppression Parts on Cable. (I/O CABLE)

	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
LG USB Drive	N	N/A	Y	PC END
MONITOR	Y	BOTH END	Y	BOTH END
KEY BOARD	N	N/A	Y	P.C END
MOUSE	Y	MOUSE END	Y	P.C END
PRINTER	N	N/A	Y	BOTH END
SERIAL MOUSE	N	N/A	Y	P.C END

6.1 CONDUCTED TEST DATA

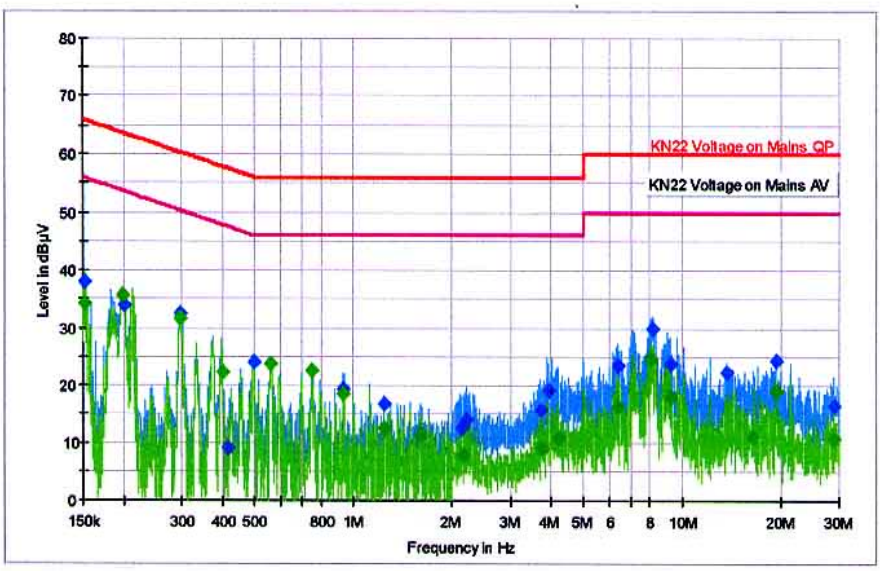
Test 1

Conducted Emission Report

Test Information

EUT Name:	UBIU
Serial Number:	-
Test Description:	KN22 CLASS B
Operating Conditions:	NORMAL
Operator Name:	KH-SEO
Comment:	H

KN22 CLASS B Hot Line



2004-12-15 오후 2:17:59

Test 2

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.151810	37.9	L1	10.0	28.0	65.9
0.201184	34.0	L1	10.2	29.5	63.6
0.297653	32.6	L1	9.7	27.7	60.3
0.413082	8.9	L1	9.7	48.7	57.6
0.495947	24.0	L1	9.7	32.1	56.1
0.747493	22.7	L1	9.7	33.3	56.0
0.934390	19.5	L1	9.7	36.5	56.0
1.243780	16.8	L1	9.7	39.2	56.0
2.132806	12.4	L1	9.7	43.6	56.0
2.196502	14.0	L1	9.7	42.0	56.0
3.697924	15.6	L1	9.9	40.4	56.0
3.919842	19.1	L1	9.9	36.9	56.0
6.397069	23.4	L1	10.0	36.6	60.0
8.169658	29.7	L1	10.1	30.3	60.0
9.278486	23.7	L1	10.2	36.3	60.0
13.753501	22.3	L1	10.5	37.7	60.0
19.406334	24.2	L1	10.7	35.8	60.0
28.927182	16.7	L1	11.3	43.3	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.152114	34.3	L1	10.0	21.6	55.9
0.197795	35.6	L1	10.2	18.1	53.7
0.296144	31.5	L1	9.7	18.8	50.4
0.399680	22.4	L1	9.7	25.4	47.9
0.559783	23.9	L1	9.7	22.1	46.0
0.746724	22.5	L1	9.7	23.5	46.0
0.932524	18.7	L1	9.7	27.3	46.0
1.241296	12.4	L1	9.7	33.6	46.0
1.606620	11.4	L1	9.7	34.6	46.0
2.165710	7.7	L1	9.7	38.3	46.0
3.738941	8.9	L1	9.9	37.1	46.0
4.193036	10.7	L1	9.9	35.3	46.0
6.351980	16.3	L1	10.0	33.7	50.0
8.080126	24.6	L1	10.1	25.4	50.0
9.259957	18.1	L1	10.2	31.9	50.0
16.481004	11.0	L1	10.6	39.0	50.0
19.406334	19.1	L1	10.7	30.9	50.0
28.943284	10.6	L1	11.3	39.4	50.0

2004-12-15 오후 2:17:59

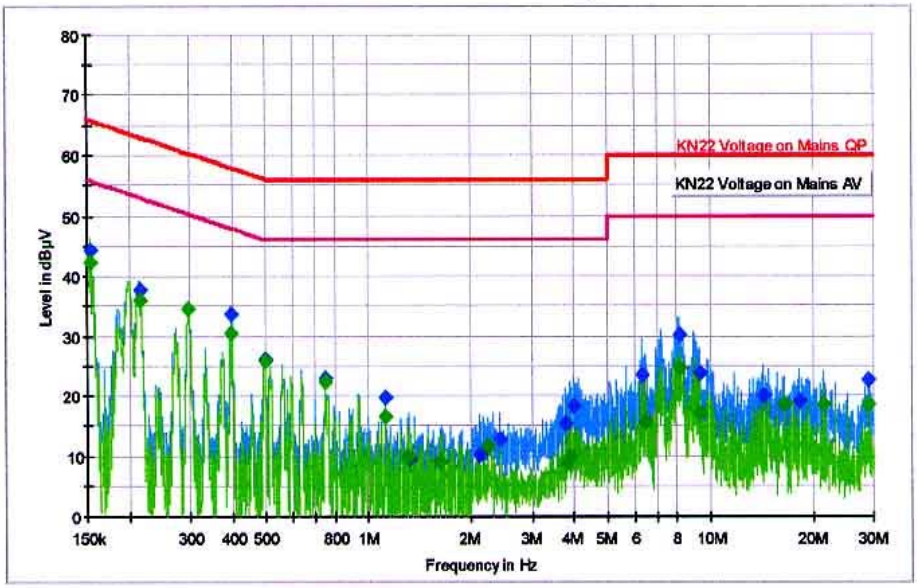
Test 1

Conducted Emission Report

Test Information

EUT Name:	UBIU
Serial Number:	-
Test Description:	KN22 CLASS B
Operating Conditions:	NORMAL
Operator Name:	KH-SEO
Comment:	N

KN22 CLASS B Neutral Line



2004-12-15 오후 2:24:38

Test 2

Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.153182	44.2	N	10.0	21.6	65.8
0.213889	37.6	N	10.1	25.5	63.1
0.298059	34.4	N	9.7	25.9	60.3
0.395500	33.6	N	9.7	24.4	57.9
0.496725	26.0	N	9.7	30.0	56.1
0.747256	22.8	N	9.7	33.2	56.0
1.119017	19.6	N	9.7	36.4	56.0
1.311761	9.6	N	9.7	46.4	56.0
2.106724	10.1	N	9.7	45.9	56.0
2.427988	12.9	N	9.8	43.1	56.0
3.761599	15.4	N	9.9	40.6	56.0
3.970203	18.2	N	9.9	37.8	56.0
6.311173	23.4	N	10.0	36.6	60.0
8.151432	30.0	N	10.1	30.0	60.0
9.301053	23.9	N	10.2	36.1	60.0
14.252243	20.0	N	10.5	40.0	60.0
18.279676	19.2	N	10.6	40.8	60.0
29.094743	22.7	N	11.3	37.3	60.0

Final Measurement Detector 2

Frequency (MHz)	Average (dBµV)	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.153182	42.4	N	10.0	13.4	55.8
0.213889	36.0	N	10.1	17.0	53.1
0.298059	34.4	N	9.7	15.9	50.3
0.396688	30.4	N	9.7	17.6	47.9
0.496725	25.8	N	9.7	20.2	46.1
0.747256	22.3	N	9.7	23.7	46.0
1.119017	16.4	N	9.7	29.6	46.0
1.302616	9.7	N	9.7	36.3	46.0
1.610055	8.9	N	9.7	37.1	46.0
2.239166	11.5	N	9.7	34.5	46.0
3.784225	8.6	N	9.9	37.4	46.0
3.891627	9.8	N	9.9	36.2	46.0
6.445041	15.6	N	10.0	34.4	50.0
8.151432	24.7	N	10.1	25.3	50.0
9.301053	17.2	N	10.2	32.8	50.0
16.458504	18.4	N	10.6	31.6	50.0
21.342757	18.5	N	10.9	31.5	50.0
29.094743	18.4	N	11.3	31.6	50.0

2004-12-15 오후 2:24:38

NOTES:

1. **All modes of operation were investigated and the worst-case emissions are reported.**
2. **The CISPR RFI conducted limits are listed on Table 1 (Page 6).**

** Measurements using CISPR quasi-peak mode.

7.1 RADIATED TEST DATA

Frequency MHz	Reading dBuV	Ant. Factor dB/m	Cable Loss Db	ANT POL (H/V)	Total dBuV/m	Limit dBuV/m	Margin dB
89.8	15.3	7.7	2.1	V	**25.1**	30	-4.9
98.9	12.7	8.9	2.3	V	**23.9**	30	-6.1
134.7	11.0	12.4	2.6	V	**26.0**	30	-4.0
152.7	9.2	12.9	2.7	V	**24.8**	30	-5.2
170.6	11.5	12.1	3.0	H	**26.6**	30	-3.4
179.6	11.1	11.3	3.0	V	**25.4**	30	-4.6
251.5	13.8	11.3	3.6	V	**28.7**	37	-8.3
269.4	14.3	12.0	3.8	V	**30.1**	37	-6.9
287.4	14.9	12.6	3.9	V	**31.4**	37	-5.6
300.0	13.9	13.0	4.0	V	**30.9**	37	-6.1
359.3	12.7	14.1	4.4	V	**31.2**	37	-5.8
404.0	12.9	15.2	4.6	H	**32.7**	37	-4.3

Radiated Measurements at 10-meters.

NOTES:

1. All modes of operation were investigated, and the worst-case emissions are reported.

2. The radiated limits are listed on Table 2 (Page 8).

** AFCL = Antenna Factor (Roberts dipole) and Cable Loss .

*** Measurements using CISPR quasi-peak mode. Above 1GHz, peak detector function mode is used using a resolution bandwidth of 1MHz and a video bandwidth of 1MHz. The peak level complies with the average limit. Peak mode is used with linearly polarized horn antenna and low-loss microwave cable.

8.1 Sample Calculations

dB □ = **20 log** $_{10}$ **(**□**)**

dB □ = **dBm + 107**

8.2 Example 1:

@ 0.51 MHz

Class B limit	=	56 dB □
Reading	=	46.1 dB □ (calibrated level)
Margin	=	46.1 - 56 = - 9.9 dB □
	=	**9.9 dB below limit**

8.3 Example 2:

@ 716.1 MHz

Class B limit	=	37 dB □
Reading	=	3.3 dB □ (calibrated level)
Antenna Factor + Cable Loss	=	28.7 dB □
Total	=	32 dB □
Margin	=	32 - 37 = - 6.2 dB □
	=	**6.2 dB below limit**

9.1 Test Equipment

Type	Manufacture	Model Number	CAL Due Date
EMI Test Receiver	Rohde & Schwarz	ESI40	2005.11.16
EMI Test Receiver	Rohde & Schwarz	ESVS30	2005.07.15
EMI Test Receiver	Rohde & Schwarz	ESCI	2005.09.13
LISN	Rohde & Schwarz	ESH2-Z5	2005.07.28
LISN	EMCO	3825/2SH	2005.08.10
Tri-Log Antennas	Schwarzbeck	VULB9160	2005.04.06
Antenna Position Tower	HD	MA240	N/A
Turn Table	EMCO	1050	N/A
Reference Network Impedance	Voltech	IEC 555	N/A
AC Power Source	PACIFIC	Magnetic Module	N/A
AC Power Source	PACIFIC	360AMX	2005.11.25
Controller	HD GmbH	HD 100	N/A
SlideBar	HD GmbH	KMS 560	N/A

10.1 Test Software Used

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software, contained on a 3-1/2 inch disc, was inserted into drive A and is auto starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is :(1) Display test, (2) RS 232 test (3) Key board test,(4) Printer test,(5) FDD test,(6) HDD test. The complete cycle takes about 20 seconds and is repeated continuously. As the keyboard and mouse are strictly input devices, no data is transmitted to them during test. They are however, continuously scanned for data input activity. The video resolution modes setup and change program was used during the radiated and conducted emission testing.

NOTE: This is a sample of the basic program used during the test. However, during testing, a different software program may be used; whichever determines the worst-case condition. In addition, the program used also depends on the number and type of devices being tested.

11.1 Conclusion

The data collected shows that the **LG Electronics Inc. LG USB Drive FCC ID : SSNUBIU** complies with §15.107 and §15.109 of the FCC Rules.