

HYUNDAI CALIBRATION & CERTIFICATION TECH. CO., LTD.

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TEST REPORT

License Holder;
LG Electronics Inc.
50 Hyangjeong-dong, Heungdeok-gu,
Cheongju-si, Chungcheongbuk-do,
361-480, KOREA.

LG Electronics Inc FRN : 0012281820

Date of Issue : December 22.2005

Test Report No.: HCT-F05-1205

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

FCC ID :

SSNUBJG

MODEL:

UBJG

Rule Part(s): **Part 15**
Equipment Class: **FCC Class B Peripheral Device (JBP)**
Standard(s): **FCC Class B: (CISPR 22)**
EUT Type: **USB Drive**
Model(s): **UBJG**
Port/Connector(s) **USB**
Manufacture **IPIA**

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 C63.4-2003

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.



Report prepared by
: Kun Hyoung KIM
Test engineer of EMC Part



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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 : SSNUBJG**
- Equipment Class: FCC Class B Peripheral Device (JPB)
- EUT Type: USB Drive
- Model(s):UBJG
- Rule Part(s): FCC Part 15 Subpart B
- Test Procedure(s): ANSI C63.4 (2003)
- Dates of Tests: December 05, 2005 ~ December 19, 2005
- 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 (ANSIC63.4-2003) was used in determining radiated and conducted emissions emanating from **LG Electronics Inc, FCC ID: SSNUBJG, USB Drive (Model(s): UBJG)**

The open area test site and conducted measurement facility used to collect the radiated data 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 C63.4 and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 23,2003
(Confirmation Number: EA90661)

3.1 PRODUCT INFORMATION

3.2 Equipment Description

Equipment Under Test (EUT) is the **LG Electronics Inc. FCC ID: SSNUBJG, USB Drive**
(Model(s): UBJG)

Storage capacity : 128MB/256MB/512MB/1G/2GB

Interface : usb Spec 2.0

Maximum data rate : 480Mbps

Power : USB bus-powered(4.5V ~ 5.5V)

Dimensions (including cabinet) : 70x22x10mm (WxHxD)

Weight (including cabinet) : 9g

※Description

	Capacity	Model Differences
Basic Model	UBJG (2GB)	Worst Case
Multiple Model	UBJG (128MB) UBJG (256MB) UBJG (512MB) UBJG (1GB)	Only type designation by a memory size of the EUT.

EMI Suppression Devices:

None

4.1 Description of Tests(Conducted)

4.2 Powerline Conducted RFI (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 remeasured 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 center 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		CISPR 22 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

*FCC Class B limits starts from 450kHz
**Limits decreases linearly with the logarithm of frequency

Table 1. RFI Conducted Limits

4.3 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[μ V/m]	FCC Limit @ 10m.* Quasi – Peak dB [μ V/m]	CISPR Limit @ 10m. Quasi-Peak dB [μ V/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	No Specified Limit
* 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
USB Drive (EUT)	IPIA	UBJG	SSNUBJG	P.C
P.C	H.P	HP Pavilion 700	DoC	N/A
Monitor	DELL	1704FPTt	DoC	PC
Mouse	Microsoft	Intellimouse optical USB and PS/2 compatible	DoC	P.C
Key Board	H.P	5181	DoC	P.C
Serial Mouse	Radio Shack	FSUGMZE3	DoC	P.C

5.2 Cable Description

		Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
USB Drive	USB	N	N	- (P,D)
PC	AC IN	N	N/A	1.8 (P)
	(Key Board) PS/2	N/A	Y	1.8 (D)
	(Mouse) PS/2	N/A	Y	1.8 (D)
	(Printer) Parallel	N/A	Y	1.8 (D)
	(Mouse) Serial	N	Y	1.8 (P,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
USB Drive	USB	N	N/A	Y	PC END
PC	AC IN	N/A	N/A	N/A	N/A
	(Key Board) PS/2	N	N/A	Y	PC END
	(Mouse) PS/2	N	N/A	Y	PC END
	(Printer) Parallel	N	N/A	Y	PC END
	(Mouse) Serial	N	N/A	Y	BOTH END

6.1 LINE-CONDUCTED TEST DATA

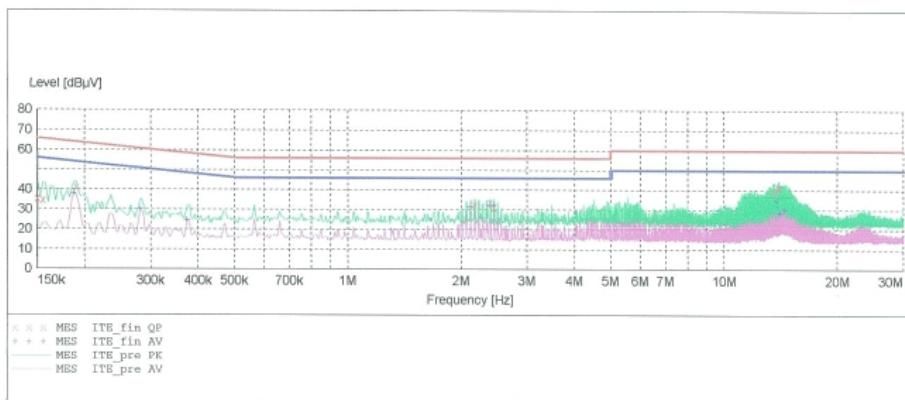
HCT

EMC TEST LAB

EUT: UBJG
 Manufacturer: IPIA
 Operating Condition: NORMAL
 Test Site: SHIELD ROOM
 Operator: KH-KIM
 Test Specification: CISPR 22 CLASS B
 Comment: H (2G)

SCAN TABLE: "CISPR 22 Voltage"

Short Description: CISPR 22 Voltage
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width MaxPeak Time Bandw.
 150.1 kHz 500.0 kHz 2.5 kHz Average 10.0 ms 9 kHz None
 500.0 kHz 5.0 MHz 5.0 kHz Average MaxPeak 10.0 ms 9 kHz None
 5.0 MHz 30.0 MHz 5.0 kHz Average MaxPeak 10.0 ms 9 kHz None
 Average



MEASUREMENT RESULT: "ITE_fin QP"

12/5/2005 8:08PM	Frequency	Level	Transd	Limit	Margin	Line	PE
	MHz	dB μ V	dB	dB μ V	dB		
	0.150100	35.80	10.1	66	30.2	---	---
	0.155100	35.00	10.1	66	30.7	---	---
	0.190100	41.30	10.1	64	22.7	---	---
	2.175000	32.70	10.3	56	23.3	---	---
	2.395000	33.80	10.3	56	22.2	---	---
	2.445000	31.30	10.3	56	24.7	---	---
	13.560000	39.30	10.5	60	20.7	---	---
	13.940000	41.90	10.5	60	18.1	---	---
	13.995000	41.60	10.5	60	18.4	---	---

MEASUREMENT RESULT: "ITE fin AV"

12/5/2005 8:08PM

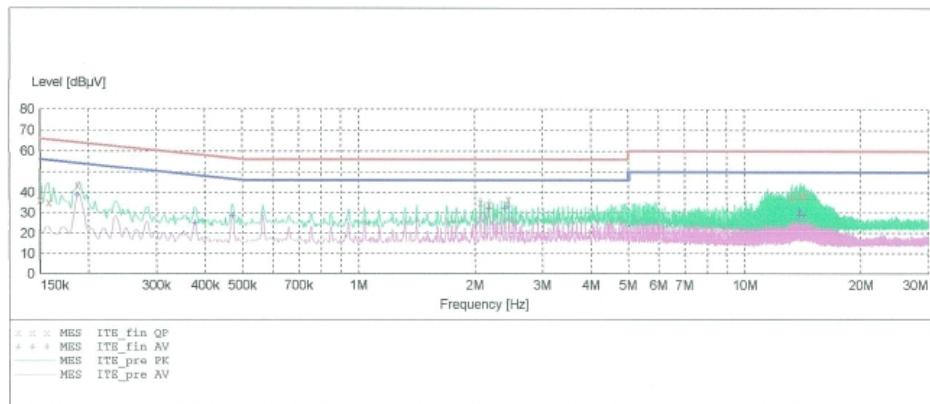
Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.187600	38.20	10.1	54	16.0	---	---
0.282600	30.00	10.1	51	20.8	---	---
0.375100	24.70	10.1	48	23.6	---	---
2.125000	31.60	10.3	46	14.4	---	---
2.395000	32.50	10.3	46	13.5	---	---
2.450000	32.50	10.3	46	13.5	---	---
13.885000	34.90	10.5	50	15.1	---	---
14.160000	28.40	10.5	50	21.6	---	---
14.540000	30.20	10.5	50	19.8	---	---

HCT
EMC TEST LAB

EUT: UBJG
 Manufacturer: IPIA
 Operating Condition: NORMAL
 Test Site: SHIELD ROOM
 Operator: KH-KIM
 Test Specification: CISPR 22 CLASS B
 Comment: N (2G)

SCAN TABLE: "CISPR 22 Voltage"

CISPR 22 Voltage						
Start Frequency	Stop Frequency	Step Width	Detector	Meas.	IF Time	Transducer
150.1 kHz	500.0 kHz	2.5 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
500.0 kHz	5.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
5.0 MHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			


MEASUREMENT RESULT: "ITC_fin QP"

12/5/2005 8:04PM	Frequency	Level	Transd	Limit	Margin	Line	PE
	MHz	dB μ V	dB	dB μ V	dB		
	0.150100	36.50	10.1	66	29.5	---	---
	0.157600	35.10	10.1	66	30.5	---	---
	0.187600	43.50	10.1	64	20.7	---	---
	2.070000	35.30	10.3	56	20.7	---	---
	2.180000	34.10	10.3	56	21.9	---	---
	2.450000	36.70	10.3	56	19.3	---	---
	13.290000	37.60	10.5	60	22.4	---	---
	13.945000	38.80	10.5	60	21.2	---	---
	14.325000	39.00	10.5	60	21.0	---	---

MEASUREMENT RESULT: "ITE fin AV"

12/5/2005 8:04PM

Frequency MHz	Level dB μ V	Transd dB	Limit dB μ V	Margin dB	Line	PE
0.187600	39.00	10.1	54	15.1	---	---
0.377600	25.30	10.1	48	23.0	---	---
0.472600	28.70	10.1	47	17.7	---	---
2.180000	32.10	10.3	46	13.9	---	---
2.395000	32.30	10.3	46	13.7	---	---
2.450000	33.20	10.3	46	12.8	---	---
13.890000	29.00	10.5	50	21.0	---	---
13.945000	31.10	10.5	50	18.9	---	---
14.270000	28.80	10.5	50	21.2	---	---

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 7).
3. Line H = Phase Line N = Neutral Line

** 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
48.0	9.3	12.3	1.5	V	23.1	30.0	6.9
120.0	13.1	11.5	2.4	V	27.0	30.0	3.0
200.5	11.1	9.6	3.2	H	23.9	30.0	6.1
273.2	15.1	12.1	3.8	H	31.0	37.0	6.0
350.0	13.8	13.9	4.3	V	32.0	37.0	5.0
427.8	7.4	16.0	4.7	V	28.1	37.0	8.9

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

$$\text{dB } \mu\text{V} = 20 \log_{10} (\mu\text{V}/\text{m})$$

8.2 Example 1:

@13.94 MHz

Class B limit	= 60 dB μV
Reading	= 41.9 dB μV (calibrated level)
Margin	= 41.9 - 60 = - 18.1 dB μV
	= 18.1 dB below limit

8.3 Example 2:

@120.0 MHz

Class B limit	= 30 dB $\mu\text{V}/\text{m}$
Reading	= 13.1 dB $\mu\text{V}/\text{m}$ (calibrated level)
Antenna Factor + Cable Loss	= 13.9 dB
Total	= 27.0 dB $\mu\text{V}/\text{m}$
Margin	= 27.0 - 30.0 = - 3.0
	= 3.0 dB below limit

9.1 Test Equipment

<u>Type</u>	<u>Manufacture</u>	<u>Model Number</u>	<u>CAL Due Date</u>
EMI Test Receiver	Rohde & Schwarz	ESVS30	2006.07.01
EMI Test Receiver	Rohde & Schwarz	ESCI	2006.09.13
LISN	Rohde & Schwarz	ESH2-Z5	2006.04.26
LISN	EMCO	703125	2006.04.26
TRILOG Antenna	Schwarzbeck	9160	2006.03.31
Antenna Position Tower	HD	MA240	N/A
Turn Table	EMCO	1050	N/A
Power Analyzer	Voltech	PM 3300	2006.03.22
Reference Network Impedance	Voltech	IEC 555	N/A
AC Power Source	PACIFIC	Magnetic Module	N/A
AC Power Source	PACIFIC	360-AMX	2006.11.25
Controller	HD GmbH	HD 100	N/A
SlideBar	HD GmbH	KMS 560	N/A
PULSE LIMITER	Rohde & Schwarz	ESH3-Z2	2006.11.16

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. FCC ID: SSNUBJG, USB Drive (Model(s): UBJG)** complies with §15.107 and §15.109 of the FCC Rules.