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EMI CERTIFICATION REPORT

LG Electronics Inc.

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Seoul, 153-023, Korea**

Date of Issue: December 18, 2009

Test Report No.: HCTE0912FE29

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

BEJLG231C

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B / CISPR 22 Class B
Equipment (EUT) Type : Cellular / PCS CDMA Phone with Bluetooth
Trade Name / Model(s) : LG Electronics Inc. / LG231C
Addition Model(s) : LG231, TFLG231CB, NTLG231CB, NTLGS231CB, LG230
MX230, MX231
Port / Connector(s) : USB Data Port / Headset Port

The device bearing the trade name and model specified above, has been shown to comply 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. (See Test Report if any modifications were made for compliance)

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.

HCT certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862.

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ATTACHMENT : TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

The **LG Electronics Inc. Model: LG231C, Cellular/PCS CDMA Phone with Bluetooth.**

It's basic purpose is used for communications. It transmits from CDMA 850 (824.70 MHz to 848.31 MHz), CDMA 1 900 (1 850.00 MHz to 1 910.20 MHz) and receives from CDMA 850 (869.70 MHz to 893.31 MHz), CDMA 1 900 (1 930.00 MHz to 1 990.00 MHz).

Model	LG231C
Addition Model	LG231, TFLG231CB, NTLG231CB, NTLGS231CB, LG230, MX230, MX231
FCC ID	BEJLG231C
E.U.T Type	Cellular/PCS CDMA Phone with Bluetooth
TX Frequency	824.70 MHz to 848.31 MHz (CDMA 850) 1 850.00 MHz to 1 910.20 MHz (CDMA 1 900)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA 850) 1 930.00 MHz to 1 990.00 MHz (CDMA 1 900)

1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Manufacturer	Model Number/ Part Number	FCC ID / DoC	Connected To
Cellular/PCS CDMA Phone with Bluetooth	LG	LG231C	BEJLG231C	Notebook PC
Notebook PC	HP	Compaq6730b	DoC	E.U.T
Notebook PC adaptor	Hipro Electronics	PPP014Y-S	-	Notebook PC
Mouse	Microsoft	Intellimouse optical USB and PS/2 compatible	DoC	Notebook PC
USB cable	-	-	-	E.U.T Notebook PC
Headset	-	-	-	-

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (M)
Cellular/PCS CDMA Phone with Bluetooth	Headset jack	-	N	(D)1.2
	USB data	Y	Y	(P,D)1.2
Notebook PC	USB (Mouse)	-	Y	(D)1.8

* The marked "(D)" means the data cable and "(P)" means the power cable.

1.5 Noise Suppression Parts on Cable. (I/O cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
Cellular/PCS CDMA Phone with Bluetooth	Headset jack	N	-	Y	E.U.T End
	USB data	N	-	Y	Both End
Notebook PC	USB (Mouse)	Y	Notebook PC End	Y	Notebook PC End

1.6 Test Methodology

Both Conducted and Radiated testing was performed according to the procedures in ANSI C63.4/2003. Radiated testing was performed at an antenna to E.U.T distance of 3 m

1.7 Test Facility

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 June 10, 2009. (Registration Number: 90661)

1.8 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

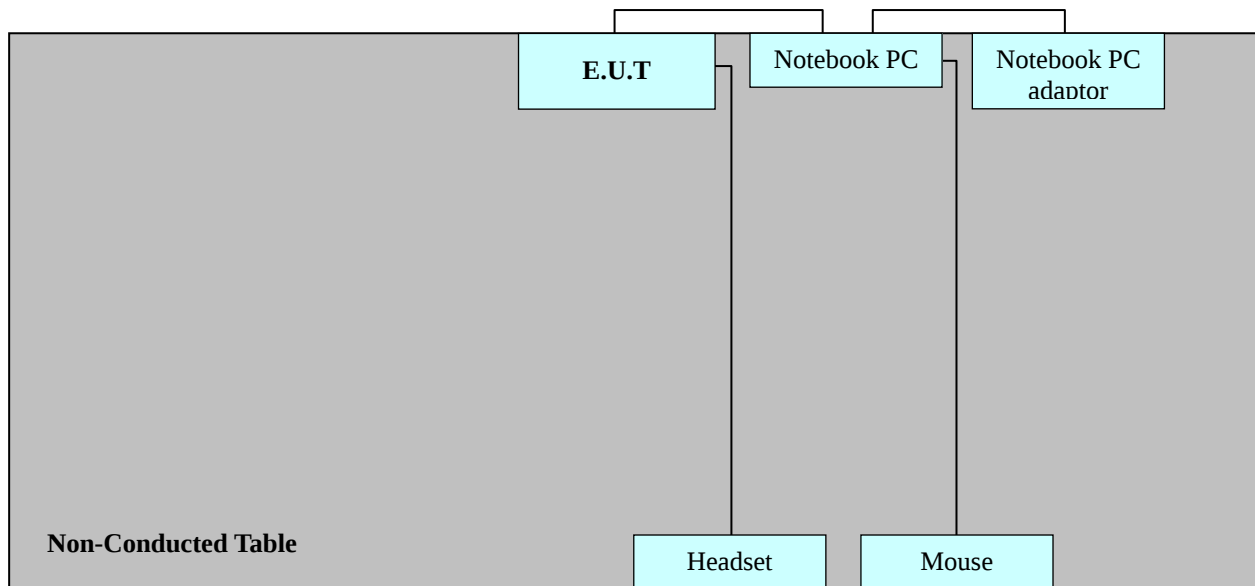
2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

Power Line Conducted test : E.U.T was connected to LISN, all other peripheral equipment were connected to another LISN. Preliminary Power Line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.

Radiated Emission test : Preliminary Radiated Emission tests were performed by using the procedure in ANSI C63.4/2003 8.3.1.1 to determine the worst operating condition. Final Radiated Emission tests were performed at 3 m open area test site.

[Configuration of Tested System]



Power Line: 110 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
Data Communication	○

3.2 Radiated Emission Test

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
Data Communication	○

4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

4.1 Conducted Emission Test

The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit apply to	: CISPR 22 Class B
Result	: Passed by 6.8 dB
Operating condition	: Data Communication mode
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Temperature	: 22.8 °C
Humidity level	: 40.3 %
Test date	: December 16, 2009

Power Line Conducted Emissions			CISPR 22 Class B		
Frequency (MHz)	Amplitude (dB μ V)	Conductor	Result	Limit (dB μ V)	Margin (dB)
0.1501	55.0	HOT	Quasi-Peak	66.00	11.0
0.7400	39.2	HOT	Average	46.0	6.8
0.7280	43.9	NEUTRAL	Quasi-Peak	56.0	12.1
0.7240	39.1	NEUTRAL	Average	46.0	6.9

* **Note:** Refer to page 9 to page 12 for details.

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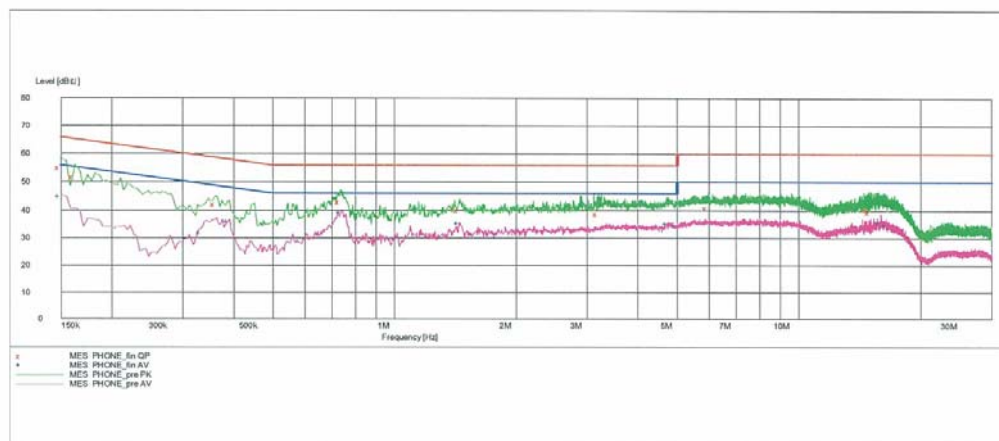
EMC

EUT : LG231C
Manufacturer : LG
Operating Condition : DATA MODE
Test Site : SHIELD ROOM
Operator : GS KIM
Test Specification : CISPR22 CLASS B
Comment : H

SCAN TABLE: "EN 55022 Voltage"

Short Description: EN 55022 Voltage

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.1 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16
Average						
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16
Average						
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3-Z5-2009.9.16



MEASUREMENT RESULT: "PHONE_fin QP"

12/16/2009 7:42AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.150100	55.00	10.0	66	11.0	1	---
0.162100	51.70	10.0	65	13.7	1	---
0.362100	42.10	10.0	59	16.6	1	---
0.736000	43.00	10.1	56	13.0	1	---
1.452000	40.10	10.1	56	15.9	1	---
3.200000	38.90	10.2	56	17.1	1	---
5.996000	40.80	10.4	60	19.2	1	---
14.936000	40.60	11.2	60	19.4	1	---
15.088000	39.50	11.2	60	20.5	1	---

12/16/2009 7:43AM HCT Lab.

MEASUREMENT RESULT: "PHONE_fin AV"

12/16/2009 7:42AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150100	44.70	10.0	56	11.3	1	---
0.334100	31.70	10.1	49	17.6	1	---
0.390100	35.80	10.0	48	12.2	1	---
0.740000	39.20	10.1	46	6.8	1	---
1.452000	35.30	10.1	46	10.7	1	---
4.764000	35.00	10.3	46	11.0	1	---
5.000000	34.30	10.3	46	11.7	1	---
15.960000	35.70	11.3	50	14.3	1	---
16.588000	34.80	11.3	50	15.2	1	---

12/16/2009 7:43AM HCT Lab.

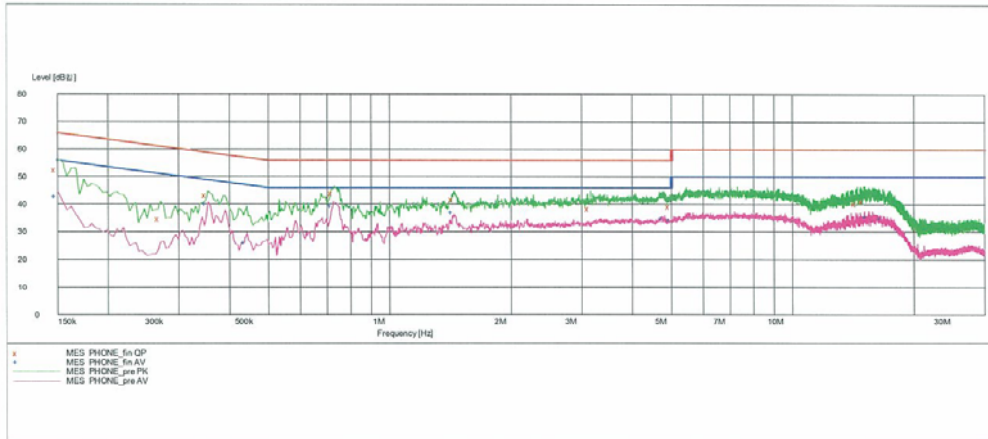
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EMC

EUT : LG231C
 Manufacturer : LG
 Operating Condition : DATACOMMUNICATION MODE
 Test Site : SHIELD ROOM
 Operator : GS KIM
 Test Specification : CISPR22 CLASS B
 Comment : N

SCAN TABLE: "EN 55022 Voltage"

Short Description: EN 55022 Voltage
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.1 kHz 500.0 kHz 4.0 kHz MaxPeak 10.0 ms 9 kHz ESH3-Z5-2009.9.16
 Average
 500.0 kHz 5.0 MHz 4.0 kHz MaxPeak 10.0 ms 9 kHz ESH3-Z5-2009.9.16
 Average
 5.0 MHz 30.0 MHz 4.0 kHz MaxPeak 10.0 ms 9 kHz ESH3-Z5-2009.9.16



MEASUREMENT RESULT: "PHONE_fin_QP"

12/16/2009 7:48AM

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Line	PE
0.150100	52.60	10.0	66	13.4	1	---
0.270100	34.80	10.1	61	26.3	1	---
0.354100	43.20	10.0	59	15.7	1	---
0.728000	43.90	10.1	56	12.1	1	---
1.452000	41.70	10.1	56	14.3	1	---
3.156000	38.40	10.2	56	17.6	1	---
5.000000	39.20	10.3	56	16.8	1	---
14.524000	40.30	11.2	60	19.7	1	---
15.128000	41.10	11.2	60	18.9	1	---

12/16/2009 7:48AM HCT Lab.

MEASUREMENT RESULT: "PHONE_fin AV"

12/16/2009 7:48AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.150100	42.70	10.0	56	13.3	1	---
0.354100	39.90	10.0	49	9.0	1	---
0.442100	26.00	10.0	47	21.0	1	---
0.724000	39.10	10.1	46	6.9	1	---
1.448000	37.00	10.1	46	9.0	1	---
4.808000	34.70	10.3	46	11.3	1	---
5.000000	34.10	10.3	46	11.9	1	---
15.448000	35.50	11.2	50	14.5	1	---
16.788000	34.70	11.3	50	15.3	1	---

12/16/2009 7:48AM HCT Lab.

4.2 Radiated Emission Test

The following table shows the highest levels of Radiated Emissions on both polarization of horizontal and vertical.

Limit apply to	: FCC PART 15 Subpart B
Result	: Passed by 11.0 dB
Operating condition	: Data Communication mode
Detector	: Quasi-Peak (6 dB Bandwidth: 120 kHz)
Temperature	: 11.0 °C
Humidity level	: 31.8.0 %
Test date	: December 16, 2009

Frequency	Reading	Ant. Factor	Cable Loss	Ant. POL	Total	Limit	Margin
MHz	dB μ V	dB/m	dB	(H/V)	dB μ V/m	dB μ V/m	dB
144.1	8.2	12.5	1.3	H	22.0	43.5	21.5
192.0	10.0	10.6	1.4	H	22.0	43.5	21.5
276.6	8.9	12.3	1.8	H	23.0	46.0	23.0
344.6	11.0	14.0	2.0	H	27.0	46.0	19.0
484.1	15.5	17.1	2.4	V	35.0	46.0	11.0
665.4	10.0	20.2	2.8	H	33.0	46.0	13.0

5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the antenna factor and cable factor.
The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF$$

Where FS = Field Strength

RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Attenuation Factor

Assume a receiver reading of 21.5 dB μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB μ V/m value is mathematically converted to its corresponding level in μ V/m.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dB}\mu\text{V/m}$$

[Radiated Emission Limits]

Frequency of Emission (MHz)	Field Strength	
	μ V/m	dB μ V/m
30 to 88	100	40.0
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

6. TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Number</u>	<u>Next CAL Date</u>
<u>Conducted Emission</u>			
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	2010.06.02
☒ LISN	Rohde & Schwarz	ESH3-Z5	2010.02.06
☐ LISN	Rohde & Schwarz	ENV216	2010.04.01
☒ Attenuator	Rohde & Schwarz	ESH3-Z2	2010.10.30
<u>Radiated Emission</u>			
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	2010.10.30
☒ Trilog Antenna	Schwarzbeck	VULB9160	2010.12.18
☒ Antenna Master	HD	MA240	
☐ Communication Antenna	TDK	LPDA-0802	-
☐ Antenna Position Tower	HD	240/520/00	-
☐ Base Station	Rohde & Schwarz	CMU 200	2010.02.17
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	2010.03.26
☒ RF-Amplifier	MITEQ	AMF-6D-00101800-35. 20P.PS	2010.04.25
☐ Bluetooth Base Station	TESCOM	TC-3000A	2010.01.09

7. CONCLUSION

The data collected shows that the **LG Electronics Inc. Model: LG231C. Cellular/PCS CDMA Phone with Bluetooth. FCC ID: BEJLG231C** complies with §15.107 and §15.109 of the FCC rules.