



HCT CO., LTD.

PRODUCT COMPLIANCE DIVISION
SAN 136-1, AMI-RI, BUBAL-EUP, ICHEON-SI, KYOUNGKI-DO, 467-701, KOREA
TEL : +82 31 639 8539 FAX : +82 31 639 8525 www.hct.co.kr

EMI CERTIFICATION REPORT

Applicant:

LG Electronics Inc.

**60-39, Gasan-dong, Gumchon-gu, Seoul
153-023, Korea**

Date of Issue: April 07, 2010

Test Report No.: HCTE1004FE14

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

IC:

**BEJLG231C
2703C-LG231C**

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B / CISPR 22 Class B
: ICES-003 Issue 4
Equipment Type : Cellular/PCS CDMA Phone with Bluetooth
Trade / Model Name : LG Electronics Inc. / LG231C
Additional Model : LG231, TFLG231CB, NTLG231CB, NTLGS231CB,
LG230, MX230, MX231, GPLG231CB
IC Model : LG231, CX231, CX231C, LG230, CX230
Port / Connector(s) : USB Data Port / Headset Port
FCC Listing No : 90661
IC Recognition No : IC 5944A-1

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.

**Report prepared by
: Dong Sup Kim
Test Engineer of EMC Tech. Part**

**Approved by
: Nam Wook Kang
Manager of EMC Tech. Part**

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test (E.U.T) is **Cellular/PCS CDMA Phone with Bluetooth, Model: LG231C** manufactured by **LG Electronics Inc.** Its basic purpose is used for communications.

Model	LG231C
IC Model	LG231, CX231, CX231C, LG230, CX230
FCC ID / IC	BEJLG231C / 2703C-LG231C
Additional Model	LG231, TFLG231CB, NTLG231CB, NTLGS231CB, LG230, MX230, MX231, GPLG231CB
E.U.T Type	Cellular/PCS CDMA Phone with Bluetooth
TX Frequency	824.70 MHz to 848.31 MHz (CDMA 850) 1 851.25 MHz to 1 908.75 MHz (CDMA 1 900)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA 850) 1 931.25 MHz to 1 988.75 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	SAMSUNG	NT-R519	DoC	E.U.T
Notebook PC adaptor	DELTA	ADP-60ZH D AD-6019R	-	Notebook PC
Mouse	Microsoft	Intellimouse optical USB and PS/2 compatible	DoC	Notebook PC
USB Cable	-	-	-	Notebook PC E.U.T
Headset	-	-	-	E.U.T

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)1.4
	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

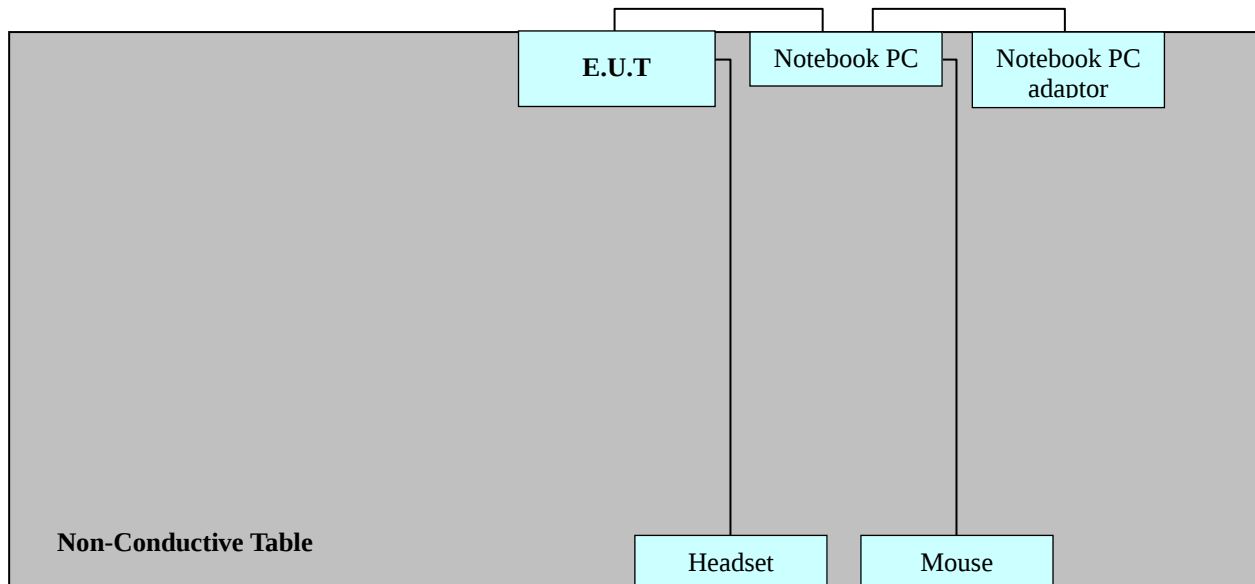
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

- Power Line Conducted test : E.U.T was connected to LISN via Notebook PC adaptor.
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

- Test E.U.T with Data Communication mode, after connecting all peripheral devices.

During preliminary tests, the following operating mode was investigated:

Operation Mode	The Worst Operating Condition
Data Communication	☐

3. 2 Radiated Emission Test

- Test E.U.T with Data Communication mode, after connecting all peripheral devices.

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 7.9 dB
Operating condition	: Data Communication mode
Detector	: Quasi-Peak, Average (6 dB Bandwidth: 9 kHz)
Temperature	: 26.1 °C
Humidity level	: 35.4 %
Test date	: April 07, 2010

Power Line Conducted Emissions			CISPR 22 Class B		
Frequency (MHz)	Amplitude (dB μ V)	Conductor	Result	Limit (dB μ V)	Margin (dB)
0.5360	48.1	HOT	Quasi-Peak	56.0	7.9
0.5160	33.6	NEUTRAL	Average	46.0	12.4
0.5160	33.6	HOT	Average	46.0	12.4
0.5160	47.3	NEUTRAL	Quasi-Peak	56.0	8.7

※ **NOTE:** Refer to page 10 to page 13 for details.

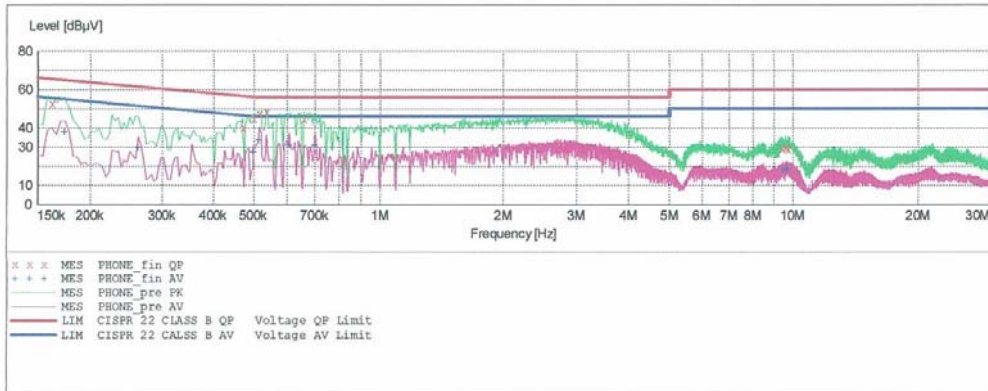
HCT

EMC

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

SCAN TABLE: "CISPR22 CLASS B"

Short Description:			CISPR22 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			



MEASUREMENT RESULT: "PHONE_fin_QP"

4/6/2010 7:56PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.162001	52.60	10.1	65	12.8	---	---
0.470001	40.00	10.1	57	16.5	---	---
0.500000	44.60	10.1	56	11.4	---	---
0.516000	47.30	10.1	56	8.7	---	---
0.536000	48.10	10.1	56	7.9	---	---
0.660000	44.60	10.1	56	11.4	---	---
9.412000	29.20	10.8	60	30.8	---	---
9.612000	29.80	10.8	60	30.2	---	---
9.756000	29.00	10.8	60	31.0	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

4/6/2010 7:56PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.174001	37.90	10.1	55	16.8	---	---
0.262001	29.70	10.0	51	21.7	---	---
0.500000	27.30	10.1	46	18.7	---	---
0.516000	33.60	10.1	46	12.4	---	---
0.608000	30.90	10.1	46	15.1	---	---
0.700000	31.00	10.1	46	15.0	---	---
9.492000	18.20	10.8	50	31.8	---	---
9.656000	18.50	10.8	50	31.5	---	---
9.724000	18.70	10.8	50	31.3	---	---

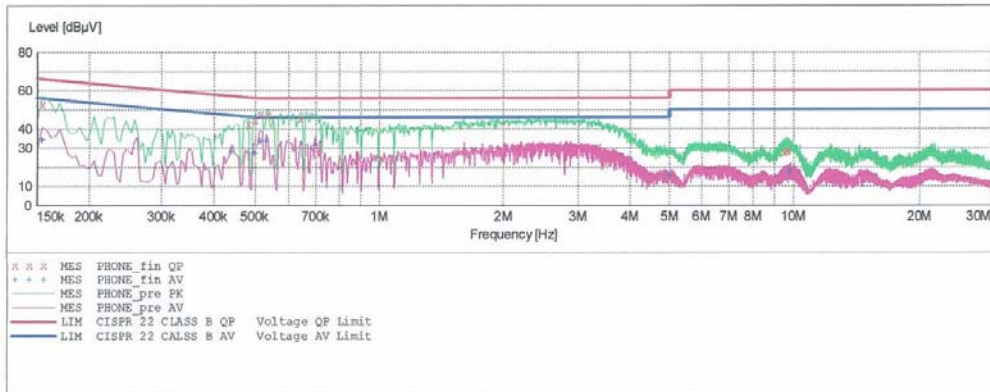
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EMC

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

SCAN TABLE: "CISPR22 CLASS B"

Short Description:			CISPR22 CLASS B			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	ESH3 (20100210)
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

4/6/2010 8:00PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.154001	52.90	10.1	66	12.9	---	---
0.482001	42.60	10.1	56	13.7	---	---
0.500000	44.70	10.1	56	11.3	---	---
0.516000	47.30	10.1	56	8.7	---	---
0.536000	47.10	10.1	56	8.9	---	---
0.644000	45.20	10.1	56	10.8	---	---
9.492000	27.70	10.8	60	32.3	---	---
9.612000	28.40	10.8	60	31.6	---	---
9.700000	28.70	10.8	60	31.3	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

4/6/2010 8:00PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Line	PE
0.154001	34.10	10.1	56	21.7	---	---
0.442001	28.40	10.1	47	18.7	---	---
0.500000	27.30	10.1	46	18.7	---	---
0.516000	33.60	10.1	46	12.4	---	---
0.532000	33.60	10.1	46	12.4	---	---
0.696000	31.40	10.1	46	14.6	---	---
5.000000	15.60	10.4	46	30.4	---	---
9.804000	17.70	10.8	50	32.3	---	---
9.872000	17.70	10.8	50	32.3	---	---

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 8.8 dB
Operating condition	: Data Communication mode
Detector	: Quasi-Peak (6 dB Bandwidth: 120 kHz)
Temperature	: 13.0 °C
Humidity level	: 36.5 %
Test date	: April 07, 2010

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
43.5	18.2	12.3	0.7	V	31.2	40.0	8.8
104.6	12.7	9.5	1.1	V	23.3	43.5	20.2
187.1	16.0	11.0	1.4	H	28.4	43.5	15.1
234.6	11.7	11.0	1.6	H	24.3	46.0	21.7
346.2	12.1	14.0	2.0	H	28.1	46.0	17.9
614.9	6.9	19.8	2.7	V	29.4	46.0	16.6

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	2011.02.05
☐ LISN	Rohde & Schwarz	ENV216	2011.04.06
☒ 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	-
☒ Turn Table	EMCO	1060	-
☐ Communication Antenna	TDK	LPDA-0802	-
☐ Antenna Position Tower	HD	240/520/00	-
☐ Base Station	Rohde & Schwarz	CMU 200	2011.02.17
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	2011.03.26
☒ RF-Amplifier	MITEQ	AMF-6D-00101800 -35.20P.PS	2010.04.25
☐ Bluetooth Base Station	TESCOM	TC-3000A	2011.01.07

7. CONCLUSION

The data collected shows that the **LG Electronics Inc. Cellular/ PCS CDMA Phone with Bluetooth. Model: LG231C, FCC ID: BEJLG231C** complies with §15.107 and §15.109 of the FCC rules and **IC: 2703C-LG231C** complies with ICES-003 Issue 4 of the IC rule.