HCT CO., LTD.

CERTIFICATION DIVISION
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EMI CERTIFICATION REPORT

Applicant:

LG Electronics MobileComm U.S.A., Inc.

1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue: January 03, 2014
Test Report No.: HCTE1401FE04

Test Site: HCT CO., LTD.
HCT FRN: 0005-8664-21

FCC ID: **ZNFL31L**

Rule Part(s) / Standard(s)	: FCC PART 15 Subpart B Class B
Equipment Type	: Cellular/PCS GSM/WCDMA and LTE Phone with Bluetooth and WLAN
Model Name	: LGL31L
Additional Model Name	: LG-L31L, L31L
Port / Connector(s)	: USB / Earphone Port
Date of Test	: December 30, 2013

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 subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Report prepared by
: Gu-Cheol Yoon
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Approved by
: Sang-Jun Lee
Manager of EMC Team

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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1401FE04	January 03, 2014	Initial Release

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is manufactured by **LG Electronics MobileComm U.S.A., Inc.**
Its basic purpose is used for communications.

Model Name	LGL31L
FCC ID	ZNFL31L
Additional Model	LG-L31L, L31L
EUT Type	Cellular/PCS GSM/WCDMA and LTE Phone with Bluetooth and WLAN
TX Frequency	824.20 ㎒ to 848.80 ㎒ (GSM 850) 1 850.20 ㎒ to 1 909.80 ㎒ (GSM 1 900) 826.40 ㎒ to 846.60 ㎒ (WCDMA 850) B5 1 852.4 ㎒ to 1 907.6 ㎒ (WCDMA 1 900) B2 1 710 ㎒ to 1 755 ㎒ (LTE B4) 704 ㎒ to 716 ㎒ (LTE B17)
RX Frequency	869.20 ㎒ to 893.80 ㎒ (GSM 850) 1 930.20 ㎒ to 1 989.80 ㎒ (GSM 1 900) 871.40 ㎒ to 891.60 ㎒ (WCDMA 850) B5 1 932.4 ㎒ to 1 987.6 ㎒ (WCDMA 1 900) B2 2 110 ㎒ to 2 155 ㎒ (LTE B4) 734 ㎒ to 746 ㎒ (LTE B17)

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	Model Name	Manufacturer	FCC ID / DoC	Connected To
EUT	LGL31L	LG	ZNFL31L	Notebook PC Ear-phone
USB cable	EAD62377902	Ningbo Broad	-	E.U.T Notebook PC
USB cable※	EAD62377903	KSD	-	E.U.T Notebook PC
Ear-phone	SGEY0003744	CRESYN	-	E.U.T
Notebook PC	ProBook6560b	H.P	DoC	EUT Notebook PC adaptor
Notebook PC adaptor	PPP009D	DELTA Electronics (JIANGSU)LTD	-	Notebook PC
Gateway	MV440	Axesstel	PH7MV440	Notebook PC, Adaptor
Mouse	Serial 2 button mouse	Radio shack	FSUGMZE3	Notebook PC
Adaptor	DA-60M12	Yang Ming Industrial	-	Gateway
RJ45 cable	-	-	-	Notebook PC, Gateway
Micro SD card	8 GB	SanDisk	-	EUT

※Note: The worst-case emissions are reported.

1.4 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	Micro USB	Y	Y	(P,D)1.0
	Ear-phone	N/A	Y	(D)1.2
Notebook PC	RJ 45	N/A	N	(D)1.5
	Serial (Mouse)	N/A	Y	(D)1.8
	DC in	N	N/A	(P)1.8
Gateway	DC in	N	N/A	(P)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
EUT	Micro USB	N	N/A	Y	Both End
	Ear-phone	N	N/A	Y	EUT End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial (Mouse)	N	N/A	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 EUT distance of 3 m.

1.7 Test Facility

Chamber used to collect the test data is located at the 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, KOREA. Those measurement facilities are constructed in conformance with the requirements of C63.4/2003.

Measurement Facilities	Reg. No.
Radiated Field strength measurement facility (3m)	90661 (June 21, 2011)
Radiated Field strength measurement facility (10m)	90661 (June 21, 2011)

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 (㎒)	Upper frequency of measurement range (㎒)
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 ㎓, whichever is lower

2. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

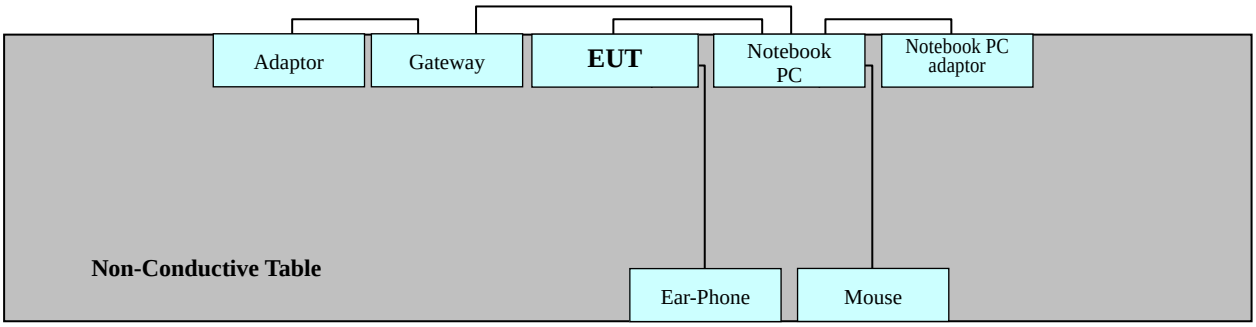
2.1.1 Conducted Emission Test

EUT was connected to LISN via Notebook PC adaptor and Base Station. 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.

2.1.2 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 semi-anechoic chamber.

[Configuration of Tested System]



Power Line: 120 VAC

3. PRELIMINARY TEST

3.1 Conducted Emission Test

■ It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: ☒ Data Communication mode

3. 2 Radiated Emission Test

■ It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: ☒ Data Communication mode

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 : FCC PART 15 Subpart B Class B

Detector : Quasi-Peak, Average (6 ㏈ Bandwidth: 9 ㎑)
Operation Mode : Data Communication mode
USB Cable Type : KSD

Temperature : 19.5°C
Humidity Level : 31.4 %
Test Date : December 30, 2013

Frequency	Transd	Conductor	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
(㎒z)	(dB)		(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV]
0.150	9.8	H	66	39.2	49.0	56	-	-
0.198	9.8	H	64	41.6	51.4	54	23.9	33.7
0.198	10.0	N	64	41.7	51.7	54	-	-
0.270	10.0	N	61	34.0	44.0	51	-	-
4.580	10.4	N	56	-	-	46	18.3	28.7
4.584	10.2	H	56	-	-	46	18.5	28.7

※ **NOTE:** Refer to page 11 to page 14 for details.

1. Line H = Hot, Line N = Neutral
2. Transd = LISN factor + Cable Loss factor

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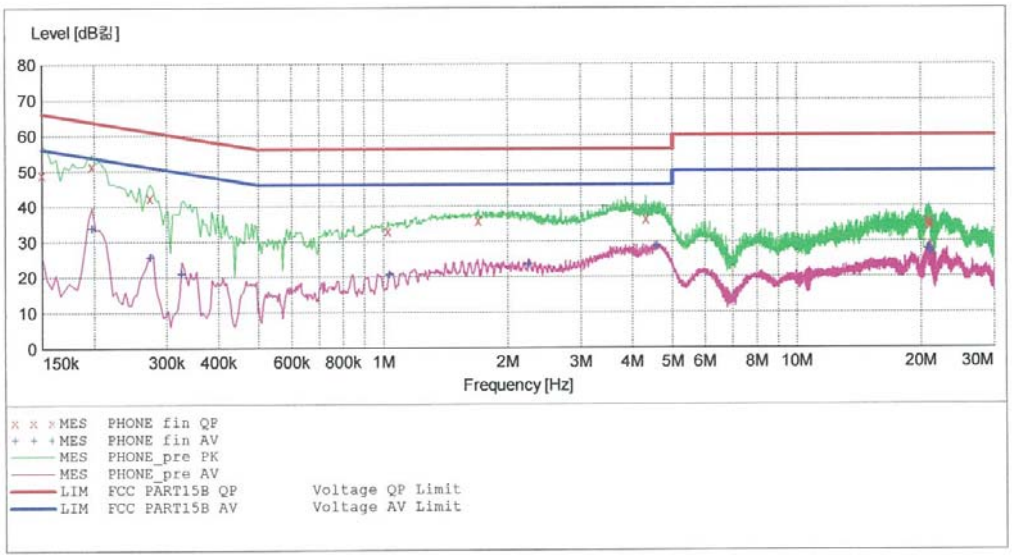
EUT: LGL31L
Manufacturer: LG
Operating Condition: DATA MODE
Test Site: SHIELD ROOM
Operator: GC YOON
Test Specification: FCC PART15B
Comment: H (KSD CABLE)
Start of Test: 2013-12-30 / 2:16:22오후

SCAN TABLE: "FCC CLASS B(H)"

Short Description: FCC CLASS B(H)

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

2013-12-30 2:19오후

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	49.00	9.8	66	17.0	---	---
0.198000	51.40	9.8	64	12.3	---	---
0.274000	42.60	9.8	61	18.4	---	---
1.028000	33.10	9.8	56	22.9	---	---
1.700000	36.00	9.9	56	20.0	---	---
4.320000	36.40	10.1	56	19.6	---	---
20.692000	35.10	11.0	60	24.9	---	---
20.904000	35.80	11.0	60	24.2	---	---
20.980000	34.80	11.0	60	25.2	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-12-30 2:19오후

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.198000	33.70	9.8	54	20.0	---	---
0.274000	25.70	9.8	51	25.3	---	---
0.326000	21.00	9.8	50	28.6	---	---
1.036000	20.70	9.8	46	25.3	---	---
2.248000	23.60	10.0	46	22.4	---	---
4.584000	28.70	10.2	46	17.3	---	---
20.772000	27.80	11.0	50	22.2	---	---
20.912000	27.90	11.0	50	22.1	---	---
21.060000	26.90	11.0	50	23.1	---	---

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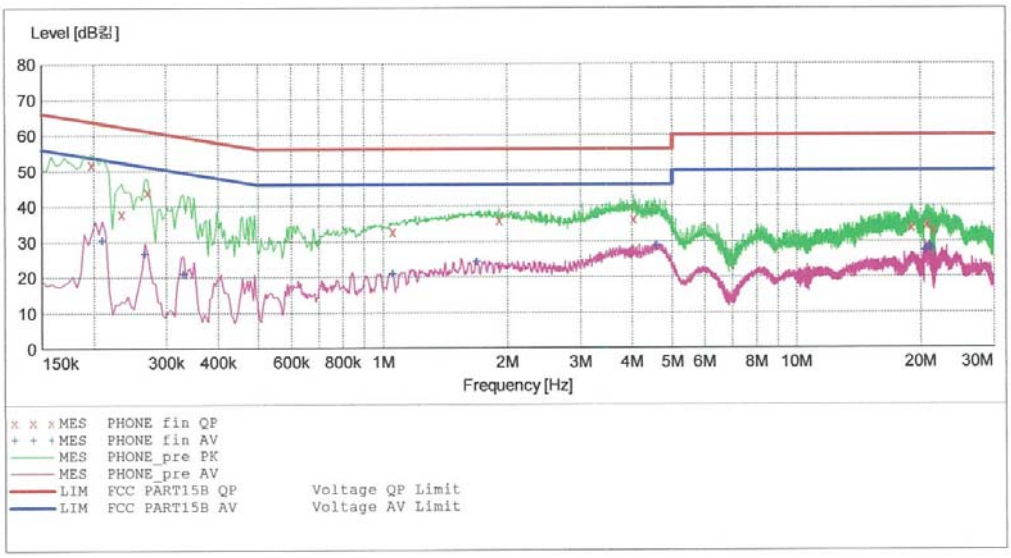
EUT:	LGL31L
Manufacturer:	LG
Operating Condition:	DATA MODE
Test Site:	SHIELD ROOM
Operator:	GC YOON
Test Specification:	FCC PART15B
Comment:	N (KSD CABLE)
Start of Test:	2013-12-30 / 2:19:47오후

SCAN TABLE: "FCC CLASS B(N)"

Short Description: FCC CLASS B(N)

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak Average	10.0 ms	9 kHz	None



MEASUREMENT RESULT: "PHONE_fin QP"

2013-12-30 2:22오후

Frequency MHz	Level dBµ	Transd dB	Limit dBµ	Margin dB	Line	PE
0.198000	51.70	10.0	64	12.0	---	---
0.234000	38.00	10.0	62	24.3	---	---
0.270000	44.00	10.0	61	17.2	---	---
1.056000	33.00	10.1	56	23.0	---	---
1.912000	36.10	10.1	56	19.9	---	---
4.044000	36.40	10.3	56	19.6	---	---
18.988000	34.00	11.2	60	26.0	---	---
20.688000	34.90	11.3	60	25.1	---	---
21.464000	33.20	11.3	60	26.8	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-12-30 2:22오후

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.210000	30.40	10.0	53	22.8	---	---
0.266000	26.70	10.0	51	24.6	---	---
0.330000	21.00	10.0	50	28.5	---	---
1.056000	21.00	10.1	46	25.0	---	---
1.688000	24.30	10.1	46	21.7	---	---
4.580000	28.70	10.4	46	17.3	---	---
20.548000	27.40	11.3	50	22.6	---	---
21.044000	28.70	11.3	50	21.3	---	---
21.252000	27.70	11.3	50	22.3	---	---

4.2 Radiated Emission Test

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

-For measurement below 1 ㎓

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Quasi-Peak (6 ㏈ Bandwidth: 120 ㎑)
Operation Mode : Data Communication mode
USB Cable Type : KSD

Temperature : 19.1°C
Humidity Level : 31.0 %
Test Date : December 30, 2013

Frequency (㎒)	Reading (㏈㎶)	Polarity (H/V)	Antenna Height (m)	Correction Factor		Limit (㏈㎶/m)	Level (㏈㎶/m)	Margin (㏈)
				Antenna (㏈/m)	Cable (㏈)			
30.6	17.11	V	1.0	11.36	3.33	40.0	31.80	8.20
32.8	14.38	V	1.0	11.42	3.34	40.0	29.14	10.86
125.0	15.01	V	1.0	12.01	3.90	43.5	30.92	12.58
275.2	17.09	H	2.0	12.60	4.45	46.0	34.14	11.86
375.0	14.22	V	1.0	15.08	4.79	46.0	34.09	11.91
625.0	14.25	V	1.0	19.97	5.39	46.0	39.61	6.39

※ **NOTE:** Polarity H = Horizontal, Polarity V = Vertical

-For measurement above 1 ㎓

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Peak mode: Peak (RBW: 1 ㎒, VBW: 1 ㎒)

: Average mode: Peak (RBW: 1 ㎒, VBW: 10 ㎐)

Operation Mode : Data Communication mode

USB Cable Type : KSD

Temperature : 19.1°C

Humidity Level : 31.0 %

Test Date : December 30, 2013

Frequency (㎓)	Peak			POL	Average		
	Total (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)		Total (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1.3329	49.1	74	24.9	V	27.7	54	26.3
1.9986	56.4	74	17.6	V	30.8	54	23.2
2.0789	51.6	74	22.4	V	29.2	54	24.8
2.6594	52.7	74	21.3	V	31.4	54	22.6

※ **NOTE:**

1. Measurement above 1 ㎓ was performed from 1 ㎓ to the 5th harmonic of highest fundamental frequency. Test was measured by 12 ㎓.

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 dBμV is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dBμV/m value is mathematically converted to its corresponding level in μV/m.

FS = 21.5 + 7.4 + 1.1 = 30 dBμV/m

[Radiated Emission Limits]

Frequency of Emission (㎒)	Field Strength	
	μV/m	dBμV/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

Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	Next CAL Date
Conducted Emission					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2014.04.25
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	2014.04.26
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	2014.02.06
☐ EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	2014.06.23
☐ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2014.07.03
☐ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2014.07.03
Radiated Emission (30 ㎒ to 1 ㎓)					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	2014.07.01
☐ Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	2015.04.16
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
Radiated Emission (1 ㎓ to 12 ㎓)					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☒ Power Amplifier	CERNEX	CBLU1183540	21690	1 year	2014.07.12
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	2014.07.01
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-

7. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS GSM/WCDMA and LTE Phone with Bluetooth and WLAN, FCC ID: ZNFL31L, Model: LGL31L** complies with §15.107 and §15.109 of the FCC rules.