HCT CO.,LTD
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, South Korea
TEL: +82-31-645-6300 FAX: +82-31-645-6401

EMI CERTIFICATION REPORT

Applicant: **LG Electronics MobileComm U.S.A., Inc.** **1000 Sylvan Avenue, Englewood Cliffs NJ 07632**	**Date of Receipt: May 28, 2014** **Date of Issue: June 11, 2014** **Test Report No. HCT-E-1406-F019** **HCT FRN: 0005866421**

FCC ID: **ZNFD631**

Rule Part(s) / Standard(s)	: FCC CFR 47 PART 15 Subpart B Class B
FCC Classification	: JBP (Part 15 B – Class B Computing Device Peripheral)
EUT Type	: Cellular/PCS GSM/WCDMA and LTE Phone with Bluetooth, WLAN and NFC
Model Name	: LG-D631
Additional Model Name	: LGD631, D631
Test Port	: USB / Earphone Port
Date of Test	: June 01, 2014

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

Tested By

Ki-Min Lee
Test Engineer
EMC Team
Certification Division

Reviewed By

Sang-Jun Lee
Technical Manager
EMC Team
Certification Division

DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1406-F019	June 11, 2014	Initial Release

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Description of EUT

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

Model	LG-D631
Additional Model	LGD631, D631
FCC ID	ZNFD631
EUT Type	Cellular/PCS GSM/WCDMA and LTE Phone with Bluetooth, WLAN and NFC
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) 1 852.4 ㎒ to 1 907.6 ㎒ (WCDMA 1 900) 1 850.7 ㎒ to 1 909.3 ㎒ (LTE B2) 1 710 ㎒ to 1 755 ㎒ (LTE B4) 824 ㎒ to 849 ㎒ (LTE B5) 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) 1 932.4 ㎒ to 1 987.6 ㎒ (WCDMA 1 900) 1 930.00 ㎒ to 1 990.00 ㎒ (LTE B2) 2 110 ㎒ to 2 155 ㎒ (LTE B4) 869 ㎒ to 894 ㎒ (LTE B5) 734 ㎒ to 746 ㎒ (LTE B17)

1.2 Related Submittal(s) / Grant(s)

Original submittal only.

1.3 Test Facility

Test site is located at 74, SEOICHEON-RO, 578BEON-GIL, MAJANG-MYEON, ICHEON-SI, GYEONGGI-DO, SOUTH KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2003.

Measurement Facilities	Reg. No.
Radiated Field strength measurement facility (3 m)	90661 (February 28, 2014)
Radiated Field strength measurement facility (10 m)	90661 (February 28, 2014)

1.4 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	LG-D631	LG	ZNFD631	Notebook PC, Earphone
USB cable	EAD62572502	Ningbo Broad	-	EUT, Notebook PC
USB cable	EAD62572501	CRESYN	-	EUT, Notebook PC
Earphone	SGEY000374	CRESYN	-	EUT
Notebook PC	ProBook6560b	HP	DoC	EUT, Notebook PC adaptor
Notebook PC adaptor	PPP009D	DELTA Electronics (JIANGSU)LTD	-	Notebook PC
Gateway	MV440	Axesstel	PH7MV440	Notebook PC, Adaptor
Serial 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)	-	Transcend	-	EUT

1.5 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)1.2
	Earphone	N/A	N	(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.

1.6 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
	Earphone	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

2. DESCRIPTION OF TEST

2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 7

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.
c. The frequency range from 150 ㎑ to 30 ㎒was searched.

[Conducted Emission Limits]

Frequency (㎒)	Resolution Bandwidth	Quasi-Peak(dB㎶)	Average(dB㎶)
0.15 to 0.5	9 ㎑	66 to 56*	56 to 46*
0.5 to 5	9 ㎑	56	46
5 to 30	9 ㎑	60	50

**Decreases with the logarithm of the frequency.*

2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2003, Clause 8

a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a 3 m shield room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 ㎓.
f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 ㎓.
g. The antenna height scans apply for both horizontal and vertical polarizations, except that for vertical polarization, the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the lowest antenna element clears the site reference ground plane by at least 25 cm. (below 1 ㎓)

[Radiated Emission Limits]

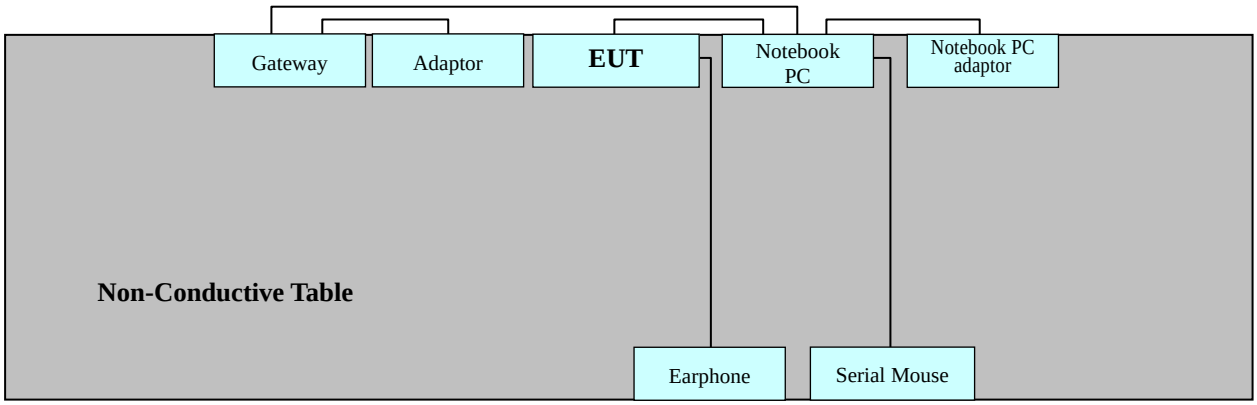
Frequency (㎒)	Antenna Distance (m)	Field Strength (㎶/m)	Quasi-Peak (dB㎶/m)
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0
Frequency (㎒)	**Antenna Distance (m)**	**Peak (dB㎶/m)**	**Average (dB㎶/m)**
Above 1 000	3	74	54

2.2.1 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	5th harmonic of the highest frequency or 40 ㎓, whichever is lower

2.3 Configuration of Tested System



Power Line: 120 VAC, 60 Hz

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

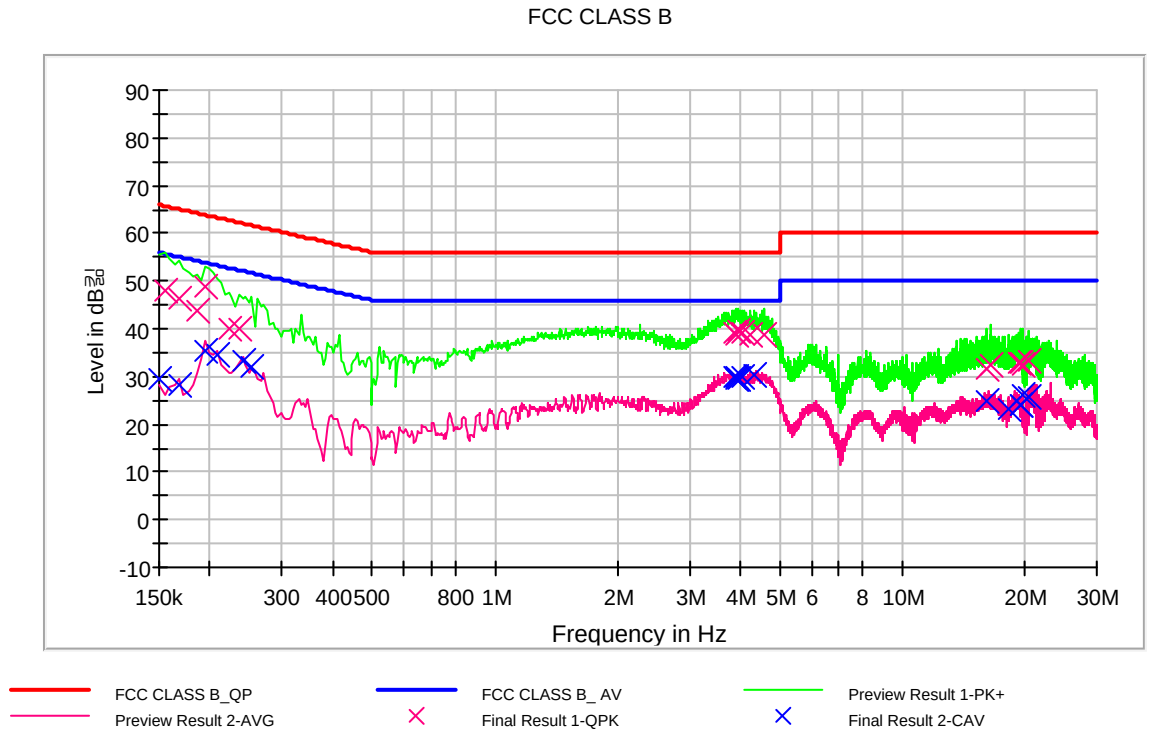
4.1 Conducted Emission Test

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, CISPR-Average
6 dB Bandwidth	: 9 ㎑
Operation Mode	: Data Communication mode
USB Manufacturer	: Ningbo Broad
	※The worst-case emissions are reported.
Temperature	: 23.9°C
Relative Humidity	: 45.1 %
Test Date	: June 01, 2014

※ NOTE: Refer to page 13 to page 18 for test data.

Figure 1: Spectral Diagrams, Conducted Emission, Phase (L1)



※ *Calculation Formula:*

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage

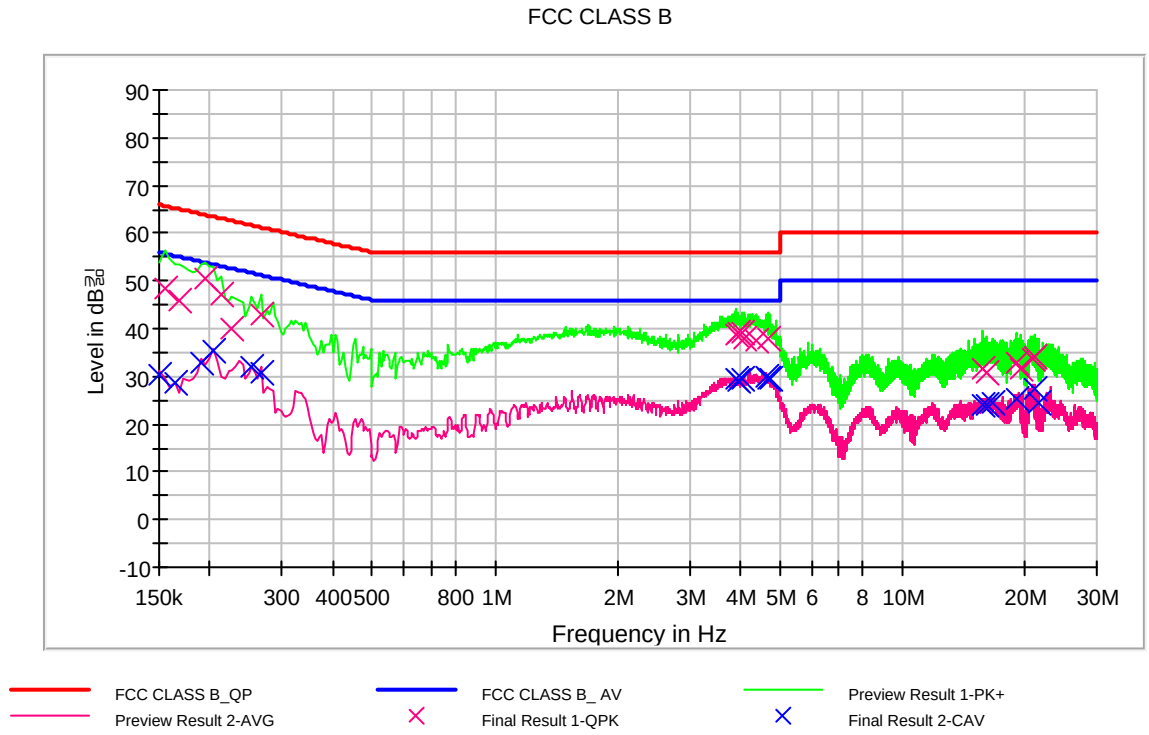
Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154500	48.1	9.000	L1	9.7	17.7	65.8
0.168000	46.2	9.000	L1	9.7	18.9	65.1
0.186000	43.8	9.000	L1	9.7	20.4	64.2
0.195000	49.0	9.000	L1	9.7	14.8	63.8
0.222000	39.8	9.000	L1	9.7	22.9	62.7
0.235500	40.0	9.000	L1	9.7	22.3	62.3
3.848000	39.3	9.000	L1	10.0	16.7	56.0
3.897500	38.6	9.000	L1	10.0	17.4	56.0
3.960500	39.7	9.000	L1	10.0	16.3	56.0
4.041500	39.1	9.000	L1	10.1	16.9	56.0
4.244000	38.9	9.000	L1	10.1	17.1	56.0
4.599500	38.8	9.000	L1	10.1	17.2	56.0
16.065500	31.5	9.000	L1	10.7	28.5	60.0
16.488500	32.3	9.000	L1	10.7	27.7	60.0
19.323500	32.9	9.000	L1	10.9	27.1	60.0
19.458500	32.8	9.000	L1	10.9	27.2	60.0
19.710500	32.3	9.000	L1	10.9	27.7	60.0
20.520500	33.2	9.000	L1	10.9	26.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	29.4	9.000	L1	9.7	26.6	56.0
0.168000	28.3	9.000	L1	9.7	26.9	55.1
0.195000	35.3	9.000	L1	9.7	18.5	53.8
0.208500	34.6	9.000	L1	9.7	18.7	53.3
0.240000	33.1	9.000	L1	9.7	19.0	52.1
0.253500	32.0	9.000	L1	9.7	19.6	51.6
3.848000	30.0	9.000	L1	10.0	16.0	46.0
3.897500	29.5	9.000	L1	10.0	16.5	46.0
3.906500	29.8	9.000	L1	10.0	16.2	46.0
3.960500	29.7	9.000	L1	10.0	16.3	46.0
4.041500	30.0	9.000	L1	10.1	16.0	46.0
4.316000	30.5	9.000	L1	10.1	15.5	46.0
16.065500	24.9	9.000	L1	10.7	25.1	50.0
18.185000	23.3	9.000	L1	10.8	26.7	50.0
19.458500	24.2	9.000	L1	10.9	25.8	50.0
19.476500	23.9	9.000	L1	10.9	26.1	50.0
19.710500	26.0	9.000	L1	10.9	24.0	50.0
20.520500	25.8	9.000	L1	10.9	24.2	50.0

Figure 2: Spectral Diagrams, Conducted Emission, Phase (N)



※ *Calculation Formula:*

1. Conductor L1 = Hot, Conductor N = Neutral
2. Corr. = LISN Factor + Cable Loss
3. QuasiPeak or CAverage= Receiver Reading + Corr.
4. Margin = Limit – QuasiPeak or CAverage

Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154500	48.4	9.000	N	9.7	17.4	65.8
0.168000	45.9	9.000	N	9.7	19.2	65.1
0.195000	50.4	9.000	N	9.7	13.4	63.8
0.213000	47.2	9.000	N	9.7	15.9	63.1
0.226500	39.9	9.000	N	9.7	22.7	62.6
0.267000	43.0	9.000	N	9.7	18.2	61.2
3.888500	38.7	9.000	N	10.0	17.3	56.0
3.965000	39.0	9.000	N	10.1	17.0	56.0
4.032500	39.2	9.000	N	10.1	16.8	56.0
4.077500	37.8	9.000	N	10.1	18.2	56.0
4.392500	37.3	9.000	N	10.1	18.7	56.0
4.671500	37.7	9.000	N	10.1	18.3	56.0
15.705500	31.5	9.000	N	10.6	28.5	60.0
16.056500	30.9	9.000	N	10.6	29.1	60.0
18.968000	32.7	9.000	N	10.8	27.3	60.0
19.535000	31.6	9.000	N	10.8	28.4	60.0
20.813000	33.7	9.000	N	10.8	26.3	60.0
21.227000	34.0	9.000	N	10.9	26.0	60.0

Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	30.3	9.000	N	9.7	25.7	56.0
0.163500	28.5	9.000	N	9.7	26.8	55.3
0.190500	32.7	9.000	N	9.7	21.3	54.0
0.204000	35.3	9.000	N	9.7	18.1	53.4
0.253500	32.1	9.000	N	9.7	19.5	51.6
0.267000	30.8	9.000	N	9.7	20.4	51.2
3.888500	29.5	9.000	N	10.0	16.5	46.0
3.965000	29.2	9.000	N	10.1	16.8	46.0
4.032500	29.6	9.000	N	10.1	16.4	46.0
4.617500	29.8	9.000	N	10.1	16.2	46.0
4.671500	29.5	9.000	N	10.1	16.5	46.0
4.743500	29.5	9.000	N	10.1	16.5	46.0
15.705500	24.2	9.000	N	10.6	25.8	50.0
16.056500	24.2	9.000	N	10.6	25.8	50.0
16.632500	24.5	9.000	N	10.7	25.5	50.0
18.968000	25.3	9.000	N	10.8	24.7	50.0
21.227000	27.5	9.000	N	10.9	22.5	50.0
21.492500	24.6	9.000	N	10.9	25.4	50.0

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: RBW 120 ㎑, VBW 300 ㎑

Operation Mode : Data Communication mode
USB Cable Manufacturer : CRESYN
※The worst-case emissions are reported.

Temperature : 24.0°C
Relative Humidity : 46.1 %
Test Date : June 01, 2014

Frequency (MHz)	Reading (dBuV)	Polarity (H/V)	Antenna Height (m)	Correction Factor		Limit (dBuV/m)	Total Level (dBuV/m)	Margin (dB)
				Antenna (dB/m)	Cable (dB)			
30.6	21.2	V	1.2	11.4	3.3	40.0	35.9	4.1
50.4	17.7	V	1.0	12.4	3.5	40.0	33.6	6.4
85.4	23.7	H	3.5	7.7	3.7	40.0	35.1	4.9
110.7	18.9	H	2.8	10.6	3.8	43.5	33.3	10.2
376.0	13.1	H	3.0	15.1	4.8	46.0	33.0	13.0
624.8	9.4	V	1.0	20.0	5.4	46.0	34.8	11.2

※ Calculation Formula:

1. Polarity H = Horizontal, Polarity V = Vertical
2. Total Level = Reading (Receiver Reading) + Correction Factor
3. Margin = Limit - Total Level

-For Measurement Above 1 ㎓

Limit Apply to : FCC PART 15 Subpart B Class B

Detector : Peak mode: Peak (RBW: 1 ㎒, VBW: 3 ㎒)
Average mode: Peak (RBW: 1 ㎒, VBW: 10 ㎐)

Highest Operating Frequency : 1.2 ㎓

※ This product was tested up to the 5th harmonic above frequency.

Operation Mode : Data Communication mode

USB cable Manufacturer : CRESYN

※The worst-case emissions are reported.

Temperature : 24.0°C

Relative Humidity : 46.1 %

Test Date : June 01, 2014

Frequency (㎓)	Polarity (H/V)	Antenna Height (m)	Correction Factor	Reading (dBuV)	Peak		
					Total Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1.3287	V	1.0	-14.3	62.0	47.7	74	26.3
1.9932	V	1.0	-12.8	69.4	56.6	74	17.4
2.6654	V	1.0	-8.9	61.7	52.8	74	21.2

Frequency (㎓)	Polarity (H/V)	Antenna Height (m)	Correction Factor	Reading (dBuV)	CAverage		
					Total Level (dB㎶/m)	Limit (dB㎶/m)	Margin (dB)
1.3287	V	1.0	-14.3	44.1	29.8	54	24.2
1.9932	V	1.0	-12.8	51.3	38.5	54	15.5
2.6654	V	1.0	-8.9	42.3	33.4	54	20.6

※ Calculation Formula:

1. Polarity H = Horizontal, Polarity V = Vertical
2. Margin = Limit - Total Level
3. Total Level = Reading (Receiver Reading) + Correction Factor
4. Corr. = Antenna Factor+ Cable Loss –Amplifier Gain

5. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	CAL Date
Conducted Emission					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	01.24. 2014
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	04.07. 2014
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	01.29. 2014
☐ EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	06.23. 2013
☐ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	07.03. 2013
☐ Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	07.03. 2013
☒ Software	Rohde & Schwarz	EMC32	-	-	-
Radiated Emission					
-For measurement below 1 ㎓					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	12.17. 2012
☒ 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	07.01. 2013
☐ Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	04.16. 2013
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-
-For measurement above 1 ㎓					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Turn Table	HD GmbH	2090	9702/1224	N/A	-
☒ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.24. 2013
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	12.13. 2012
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	07.01. 2013
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☐ Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
☐ Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170124	2 year	10.30. 2013
☐ Power Amplifier	CERNEX	CBL18265035	22966	1 year	07.24. 2013
☐ Power Amplifier	CERNEX	CBL26405040	19660	1 year	04.04. 2014
☒ Software	Rohde & Schwarz	EMC32	-	-	-

6. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS GSM/WCDMA and LTE Phone with Bluetooth, WLAN and NFC, FCC ID: ZNFD631, Model: LG-D631** complies with §15.107 and §15.109 of the FCC rules.