

# EMI CERTIFICATION REPORT

**Applicant:**

**LG Electronics MobileComm U.S.A., Inc.**  
**1000 Sylvan Avenue, Englewood Cliffs NJ 07632**

**Date of Issue: January 21, 2014**

**Test Report No.: HCTE1401F004**

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

**FCC ID:**

**ZNFD400HN**

**Rule Part(s) / Standard(s):** FCC PART 15 Subpart B Class B  
**Equipment Type:** Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN and NFC (Felica)  
**Model Name:** LG-D400hn  
**Additional Model Name:** D400hn, D400HN, LGD400hn, LGD400HN, LG-D400HN, D400ARn, D400ARN, LGD400ARn, LGD400ARN, LG-D400ARN, LG-D400ARn  
**Port / Connector(s):** USB / Earphone Port  
**Date of Test:** January 18, 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 denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

**Tested By**



**Seul-Ki Lee**  
**Test Engineer**  
**EMC Team**  
**Certification Division**

**Reviewed By**



**Sang-Jun Lee**  
**Technical Manager**  
**EMC Team**  
**Certification Division**

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.



## DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1401F004	January 21, 2014	Initial Release



## TABLE OF CONTENTS

	<b>PAGE</b>
1. GENERAL INFORMATION .....	4
1.1 Product Description .....	4
1.2 Related Submittal(s) / Grant(s).....	4
1.3 Tested System Details.....	5
1.4 Cable Description .....	6
1.5 Noise Suppression Parts on Cable. (I/O cable) .....	6
1.6 Test Methodology .....	7
1.7 Test Facility .....	7
1.8 Frequency Range of Radiated Measurements .....	7
2. SYSTEM TEST CONFIGURATION.....	8
2.1 Configuration of Test System .....	8
3. PRELIMINARY TEST .....	9
3.1 Conducted Emission Test .....	9
3.2 Radiated Emission Test .....	9
4. CONDUCTED AND RADIATED EMISSION TEST SUMMARY .....	10
4.1 Conducted Emission Test .....	10
4.2 Radiated Emission Test .....	10
5. FIELD STRENGTH CALCULATION .....	17
6. TEST EQUIPMENT .....	18
7. CONCLUSION .....	19

**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.

<b>Model Name</b>	LG-D400hn
<b>Additional Model Name</b>	D400hn, D400HN, LGD400hn, LGD400HN, LG-D400HN, D400ARn, D400ARN, LGD400ARn, LGD400ARN, LG-D400ARN, LG-D400ARn
<b>FCC ID</b>	ZNFD400HN
<b>EUT Type</b>	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN and NFC (Felica)
<b>TX Frequency</b>	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 1 900) 826.40 MHz to 846.60 MHz (WCDMA 850) 1 852.4 MHz to 1 907.6 MHz (WCDMA 1 900)
<b>RX Frequency</b>	869.20 MHz to 893.80 MHz (GSM 850) 1 930.20 MHz to 1 989.80 MHz (GSM 1 900) 871.40 MHz to 891.60 MHz (WCDMA 850) 1 932.4 MHz to 1 987.6 MHz (WCDMA 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	Model Name	Manufacturer	FCC ID / DoC	Connected To
EUT	LG-D400hn	LG	ZNFD400HN	Notebook PC Ear-phone
USB cable	EAD62377902	Broad Ningbo	-	E.U.T Notebook PC
Ear-phone	EAB62209304	I-SOUND	-	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
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	8GB	SanDisk	-	E.U.T



## 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	N	(D)1.2
Notebook PC	RJ 45	N/A	N	(D)1.5
	Serial (Mouse)	N/A	N	(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 ANSI 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 (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 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower



## 2. SYSTEM TEST CONFIGURATION

### 2.1 Configuration of Test System

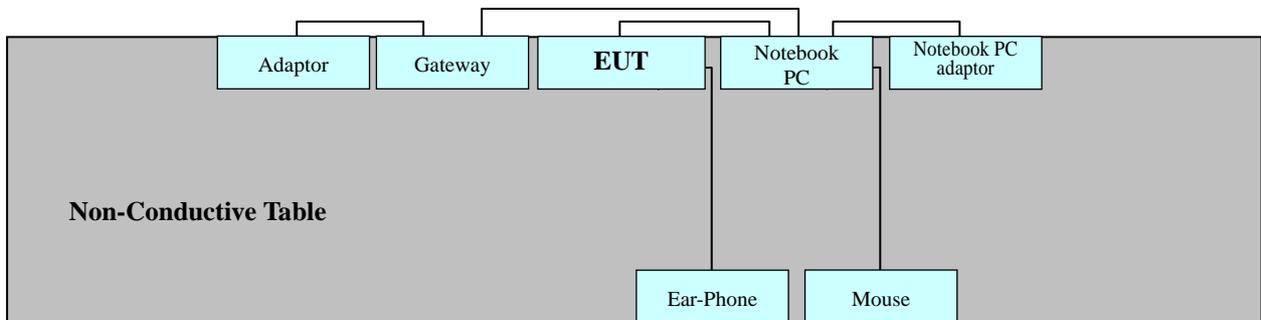
#### 2.1.1 Conducted Emission Test

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 dB Bandwidth: 9 kHz)
Operation Mode	: Data Communication mode
Temperature	: 20.8°C
Humidity Level	: 30.1 %
Test Date	: January 18, 2014

Frequency (MHz)	Transd (dB)	Conductor	Quasi-Peak			Average		
			Limit (dBuV)	Measurement Level (dBuV)	Result Level (dBuV)	Limit (dBuV)	Measurement Level (dBuV)	Result Level (dBuV)
0.1500	9.8	H	66.0	46.4	56.2	56.0	23.8	33.6
0.1500	10.0	N	66.0	46.5	56.5	56.0	-	-
0.1590	10.0	N	65.5	44.1	54.1	55.5	24.5	34.5
0.1590	9.8	H	65.5	44.3	54.1	55.5	24.6	34.4
0.1770	10.0	N	64.6	38.8	48.8	54.6	18.5	28.5
0.1995	9.8	H	63.6	39.6	49.4	53.6	20.8	30.6

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

1. Conductor H = Hot, Conductor N = Neutral
  2. Transducer = LISN Factor + Cable Loss Factor
  3. Result Level = Measurement Level + Transducer Factor
- \* 'Result Level' in above table is same as the 'Quasi-Peak' and 'Average' of the test data



EMI Auto Test(1)

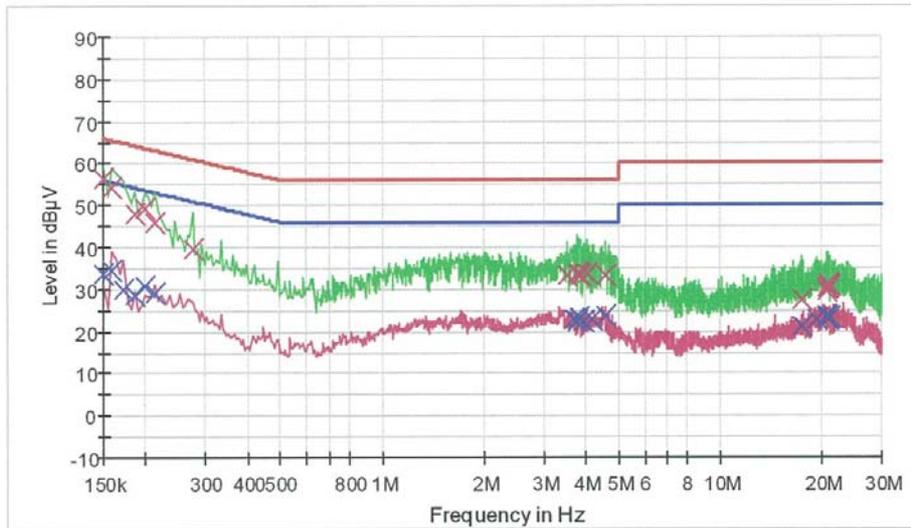
1 / 2

# HCT TEST Report

## Common Information

EUT: LG-D400hn  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: DATA MODE, H LINE  
 Operator Name:

FCC CLASS B



— FCCCLASS B\_QP      — FCCCLASS B\_AV      — Preview Result 1-PK+  
 — Preview Result 2-AVG      X Final Result 1-QPK      X Final Result 2-CAV

## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	56.2	9.000	Off	L1	9.8	9.8	66.0
0.159000	54.1	9.000	Off	L1	9.8	11.4	65.5
0.186000	48.2	9.000	Off	L1	9.8	16.0	64.2
0.199500	49.4	9.000	Off	L1	9.8	14.2	63.6
0.213000	46.1	9.000	Off	L1	9.8	17.0	63.1
0.276000	39.6	9.000	Off	L1	9.8	21.3	60.9
3.542000	33.2	9.000	Off	L1	10.1	22.8	56.0
3.794000	33.6	9.000	Off	L1	10.1	22.4	56.0
3.812000	33.5	9.000	Off	L1	10.1	22.5	56.0
3.848000	33.4	9.000	Off	L1	10.1	22.6	56.0
4.023500	33.5	9.000	Off	L1	10.1	22.5	56.0
4.563500	33.5	9.000	Off	L1	10.2	22.5	56.0
17.348000	27.5	9.000	Off	L1	10.8	32.5	60.0
20.561000	29.6	9.000	Off	L1	10.9	30.4	60.0
20.754500	30.3	9.000	Off	L1	11.0	29.7	60.0
20.813000	30.4	9.000	Off	L1	11.0	29.6	60.0



## EMI Auto Test(1)

2 / 2

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
20.988500	31.2	9.000	Off	L1	11.0	28.8	60.0
21.195500	30.6	9.000	Off	L1	11.0	29.4	60.0

## Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	33.6	9.000	Off	L1	9.8	22.4	56.0
0.159000	34.4	9.000	Off	L1	9.8	21.1	55.5
0.172500	30.0	9.000	Off	L1	9.8	24.8	54.8
0.186000	28.7	9.000	Off	L1	9.8	25.5	54.2
0.199500	30.6	9.000	Off	L1	9.8	23.0	53.6
0.213000	29.1	9.000	Off	L1	9.8	24.0	53.1
3.690500	22.9	9.000	Off	L1	10.1	23.1	46.0
3.789500	22.4	9.000	Off	L1	10.1	23.6	46.0
3.812000	23.0	9.000	Off	L1	10.1	23.0	46.0
3.965000	22.1	9.000	Off	L1	10.1	23.9	46.0
4.181000	22.7	9.000	Off	L1	10.1	23.3	46.0
4.563500	23.5	9.000	Off	L1	10.2	22.5	46.0
17.348000	20.9	9.000	Off	L1	10.8	29.1	50.0
19.296500	22.7	9.000	Off	L1	10.9	27.3	50.0
20.561000	23.5	9.000	Off	L1	10.9	26.5	50.0
20.754500	23.0	9.000	Off	L1	11.0	27.0	50.0
20.840000	22.8	9.000	Off	L1	11.0	27.2	50.0
21.195500	23.0	9.000	Off	L1	11.0	27.0	50.0



EMI Auto Test(1)

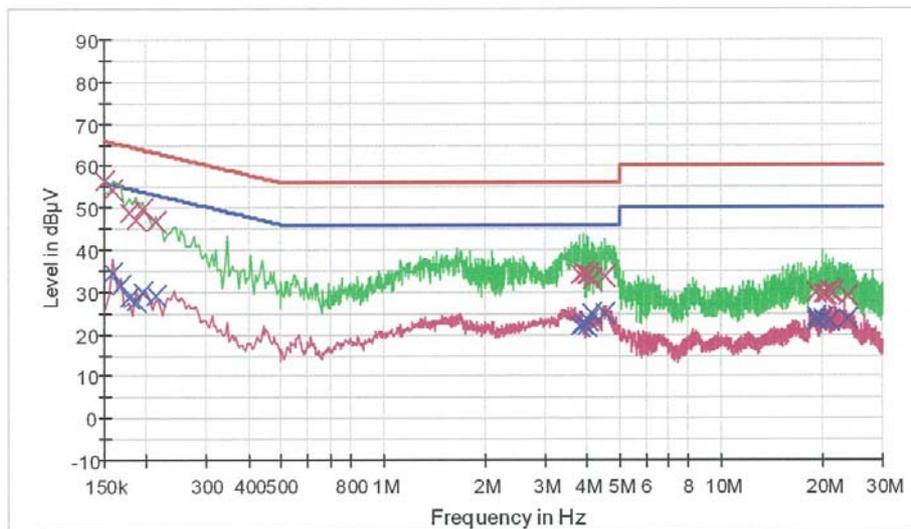
1 / 2

# HCT TEST Report

## Common Information

EUT: LG-D400hn  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: DATA MODE, N LINE  
 Operator Name:

FCC CLASS B



— FCCCLASS B\_OP     
 — FCCCLASS B\_AV     
 — Preview Result 1-PK+  
— Preview Result 2-AVG     
 x Final Result 1-QPK     
 x Final Result 2-CAV

## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	56.5	9.000	Off	N	10.0	9.5	66.0
0.159000	54.1	9.000	Off	N	10.0	11.4	65.5
0.177000	48.8	9.000	Off	N	10.0	15.8	64.6
0.186000	47.3	9.000	Off	N	10.0	16.9	64.2
0.195000	49.6	9.000	Off	N	10.0	14.2	63.8
0.213000	46.5	9.000	Off	N	10.0	16.6	63.1
3.834500	33.9	9.000	Off	N	10.3	22.1	56.0
3.897500	34.7	9.000	Off	N	10.3	21.3	56.0
3.996500	34.0	9.000	Off	N	10.3	22.0	56.0
4.050500	34.3	9.000	Off	N	10.3	21.7	56.0
4.122500	32.8	9.000	Off	N	10.3	23.2	56.0
4.541000	33.5	9.000	Off	N	10.4	22.5	56.0
19.098500	30.1	9.000	Off	N	11.2	29.9	60.0
19.940000	29.7	9.000	Off	N	11.2	30.3	60.0
20.376500	29.5	9.000	Off	N	11.3	30.5	60.0
20.921000	30.4	9.000	Off	N	11.3	29.6	60.0



## EMI Auto Test(1)

2 / 2

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
21.344000	29.9	9.000	Off	N	11.3	30.1	60.0
23.648000	28.9	9.000	Off	N	11.5	31.1	60.0

## Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.159000	34.5	9.000	Off	N	10.0	21.0	55.5
0.168000	31.7	9.000	Off	N	10.0	23.4	55.1
0.177000	28.5	9.000	Off	N	10.0	26.1	54.6
0.186000	27.8	9.000	Off	N	10.0	26.4	54.2
0.195000	30.0	9.000	Off	N	10.0	23.8	53.8
0.213000	28.9	9.000	Off	N	10.0	24.2	53.1
3.839000	22.1	9.000	Off	N	10.3	23.9	46.0
3.897500	22.4	9.000	Off	N	10.3	23.6	46.0
3.996500	22.0	9.000	Off	N	10.3	24.0	46.0
4.050500	23.0	9.000	Off	N	10.3	23.0	46.0
4.122500	24.7	9.000	Off	N	10.3	21.3	46.0
4.541000	25.0	9.000	Off	N	10.4	21.0	46.0
19.040000	23.4	9.000	Off	N	11.2	26.6	50.0
19.098500	23.9	9.000	Off	N	11.2	26.1	50.0
19.989500	23.6	9.000	Off	N	11.2	26.4	50.0
20.921000	23.1	9.000	Off	N	11.3	26.9	50.0
20.939000	23.2	9.000	Off	N	11.3	26.8	50.0
23.648000	23.5	9.000	Off	N	11.5	26.5	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 GHz

Limit Apply to	: FCC PART 15 Subpart B Class B
Detector	: Quasi-Peak (6 dB Bandwidth: 120 kHz)
Operation Mode	: Data Communication mode
Temperature	: 20.6°C
Humidity Level	: 30.2 %
Test Date	: January 18, 2014

Frequency (MHz)	Reading (dBuV)	Polarity (H/V)	Antenna Height (m)	Correction Factor		Limit (dBuV/m)	Level (dBuV/m)	Margin (dB)
				Antenna (dB/m)	Cable (dB)			
34.60	17.70	V	1.00	11.46	3.34	40.0	32.50	7.50
125.00	19.39	V	1.22	12.01	3.90	43.5	35.30	8.20
375.00	18.14	H	1.00	15.08	4.79	46.0	38.00	8.00
625.00	14.44	V	1.00	19.97	5.39	46.0	39.80	6.20



### -For measurement above 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

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

Temperature : 20.6°C

Humidity Level : 30.2 %

Test Date : January 18, 2014

Frequency (GHz)	Peak			POL	Average		
	Total (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)		Total (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)
1.3334	51.7	74	22.3	V	27.4	54	26.6
1.9914	56.0	74	18.0	V	31.7	54	22.3
2.6653	52.5	74	21.5	V	31.5	54	22.5

※ **NOTE:**

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



## 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 $\mu$ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB $\mu$ V/m value is mathematically converted to its corresponding level in  $\mu$ 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	
	$\mu$ V/m	dB $\mu$ 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 Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>Next CAL Date</u>
<b><u>Conducted Emission</u></b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2014.04.25
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	2014.04.26
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	2014.02.06
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	2014.06.23
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	2014.07.03
<input type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	2014.07.03
<b><u>Radiated Emission</u></b>					
<b>-For measurement below 1 GHz</b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
<input checked="" type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input checked="" type="checkbox"/> Turn Table	HD GmbH	2090	9702/1224	N/A	-
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	2014.07.01
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	2015.04.16
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<b>-For measurement above 1 GHz</b>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
<input checked="" type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input checked="" type="checkbox"/> Turn Table	HD GmbH	2090	9702/1224	N/A	-
<input checked="" type="checkbox"/> Power Amplifier	CERNEX	CBLU1183540	21690	1 year	2014.07.12
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	2014.07.01
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-



## 7. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA /HSUPA Phone with Bluetooth, WLAN and NFC (Felica), FCC ID: ZNFD400HN, Model: LG-D400hn** complies with §15.107 and §15.109 of the FCC rules.