

## EMI CERTIFICATION REPORT

**Applicant:**

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

**Date of Issue: January 15, 2014**

**Test Report No.: HCTE1401F001**

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

**FCC ID:**

**ZNFD405**

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 and WLAN  
Model Name : LG-D405  
Additional Model Name : D405, LGD405  
Port / Connector(s) : USB / Earphone Port  
Date of Test : January 13, 2014 - January 14, 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**



Seul-Ki Lee  
Test Engineer  
EMC Team  
Certification Division

**Reviewed By**



Sang-Jun Lee  
Technical Manager  
EMC Team  
Certification Division

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## DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCTE1401F001	January 15, 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.

<b>Model Name</b>	LG-D405
<b>Additional Model Name</b>	D405, LGD405
<b>FCC ID</b>	ZNFD405
<b>EUT Type</b>	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA Phone with Bluetooth and WLAN
<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) 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) 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-D405	LG	ZNFD405	Notebook PC Ear-phone
USB cable	EAD62377902	Broad Ningbo	-	E.U.T Notebook PC
Ear-phone	EAB62209201	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
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)1.1
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

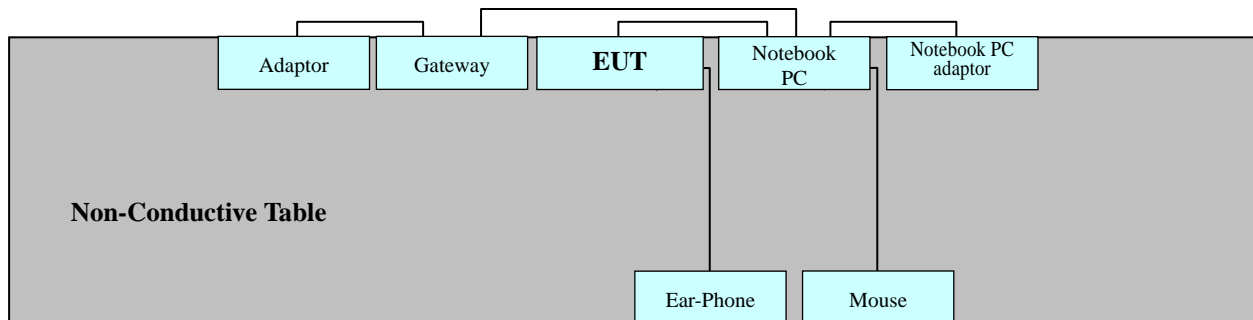
#### 2.1.1 Conducted Emission Test

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	: 20.4°C
Humidity Level	: 29.8 %
Test Date	: January 14, 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)
0.1590	9.8	H	65.5	46.1	55.9	55.5	24.6	34.4
0.1590	10.0	N	65.5	45.1	55.1	55.5	25.5	35.5
0.1860	10.0	N	64.2	41.1	51.1	54.2	20.1	30.1
0.1860	9.8	H	64.2	39.9	49.7	54.2	-	-
0.1995	9.8	H	63.6	40.5	50.3	53.6	20.3	30.1
0.1995	10.0	N	63.6	41.0	51.0	53.6	-	-

※ **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)

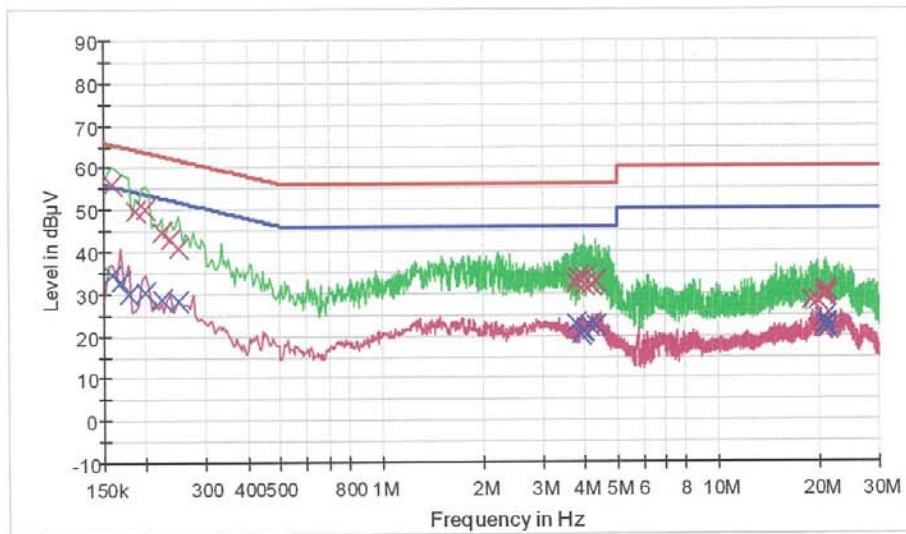
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# HCT TEST Report

## Common Information

EUT: LG-D405  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: DATA MODE (H)  
 Operator Name: SK LEE

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)
0.159000	55.9	9.000	Off	L1	9.8	9.6	65.5
0.186000	49.7	9.000	Off	L1	9.8	14.5	64.2
0.199500	50.3	9.000	Off	L1	9.8	13.3	63.6
0.222000	44.7	9.000	Off	L1	9.8	18.0	62.7
0.235500	42.8	9.000	Off	L1	9.8	19.5	62.3
0.249000	40.9	9.000	Off	L1	9.8	20.9	61.8
3.794000	32.3	9.000	Off	L1	10.1	23.7	56.0
3.825500	33.8	9.000	Off	L1	10.1	22.2	56.0
3.978500	33.7	9.000	Off	L1	10.1	22.3	56.0
4.014500	31.9	9.000	Off	L1	10.1	24.1	56.0
4.181000	32.0	9.000	Off	L1	10.1	24.0	56.0
4.325000	32.8	9.000	Off	L1	10.1	23.2	56.0
18.941000	28.0	9.000	Off	L1	10.9	32.0	60.0
19.823000	28.1	9.000	Off	L1	10.9	32.0	60.0
20.565500	29.5	9.000	Off	L1	10.9	30.5	60.0
20.822000	30.5	9.000	Off	L1	11.0	29.5	60.0

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EMI Auto Test(1)

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Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
20.948000	30.9	9.000	Off	L1	11.0	29.1	60.0
20.984000	29.7	9.000	Off	L1	11.0	30.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	34.4	9.000	Off	L1	9.8	21.1	55.5
0.168000	32.9	9.000	Off	L1	9.8	22.2	55.1
0.177000	29.9	9.000	Off	L1	9.8	24.7	54.6
0.199500	30.1	9.000	Off	L1	9.8	23.5	53.6
0.222000	28.5	9.000	Off	L1	9.8	24.2	52.7
0.249000	28.3	9.000	Off	L1	9.8	23.5	51.8
3.794000	22.8	9.000	Off	L1	10.1	23.2	46.0
3.893000	20.4	9.000	Off	L1	10.1	25.6	46.0
3.951500	21.1	9.000	Off	L1	10.1	24.9	46.0
4.014500	21.0	9.000	Off	L1	10.1	25.0	46.0
4.158500	22.2	9.000	Off	L1	10.1	23.8	46.0
4.325000	22.4	9.000	Off	L1	10.1	23.6	46.0
20.565500	24.2	9.000	Off	L1	10.9	25.8	50.0
20.822000	22.9	9.000	Off	L1	11.0	27.1	50.0
20.849000	22.2	9.000	Off	L1	11.0	27.8	50.0
20.948000	22.9	9.000	Off	L1	11.0	27.1	50.0
20.984000	22.6	9.000	Off	L1	11.0	27.4	50.0
21.200000	21.4	9.000	Off	L1	11.0	28.6	50.0



EMI Auto Test(1)

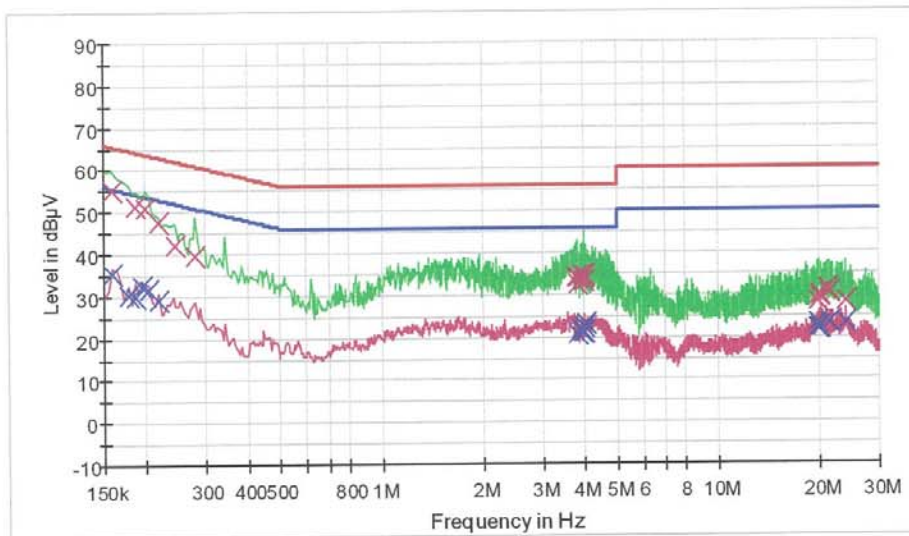
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# HCT TEST Report

## Common Information

EUT: LG-D405  
 Manufacturer: LG  
 Test Site: SHIELD ROOM  
 Operating Conditions: DATA MODE (N)  
 Operator Name: SK LEE

FCC CLASS B



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

## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	55.1	9.000	Off	N	10.0	10.4	65.5
0.186000	51.1	9.000	Off	N	10.0	13.1	64.2
0.199500	51.0	9.000	Off	N	10.0	12.6	63.6
0.217500	47.5	9.000	Off	N	10.0	15.4	62.9
0.244500	42.3	9.000	Off	N	10.0	19.6	61.9
0.280500	39.4	9.000	Off	N	10.0	21.4	60.8
3.785000	34.2	9.000	Off	N	10.3	21.8	56.0
3.830000	34.3	9.000	Off	N	10.3	21.7	56.0
3.839000	32.3	9.000	Off	N	10.3	23.7	56.0
3.947000	34.5	9.000	Off	N	10.3	21.5	56.0
3.992000	34.6	9.000	Off	N	10.3	21.4	56.0
4.001000	33.1	9.000	Off	N	10.3	22.9	56.0
19.782500	28.4	9.000	Off	N	11.2	31.6	60.0
19.998500	30.1	9.000	Off	N	11.2	29.9	60.0
20.039000	29.6	9.000	Off	N	11.2	30.4	60.0
21.146000	31.1	9.000	Off	N	11.3	28.9	60.0

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## EMI Auto Test(1)

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Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
21.335000	30.2	9.000	Off	N	11.3	29.8	60.0
24.039500	28.2	9.000	Off	N	11.5	31.8	60.0

## Final Result 2

Frequency (MHz)	CAverage (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.159000	35.5	9.000	Off	N	10.0	20.0	55.5
0.177000	30.4	9.000	Off	N	10.0	24.2	54.6
0.186000	30.1	9.000	Off	N	10.0	24.1	54.2
0.195000	32.3	9.000	Off	N	10.0	21.5	53.8
0.204000	31.5	9.000	Off	N	10.0	21.9	53.4
0.217500	29.0	9.000	Off	N	10.0	23.9	52.9
3.839000	20.6	9.000	Off	N	10.3	25.4	46.0
3.897500	22.0	9.000	Off	N	10.3	24.0	46.0
3.947000	21.0	9.000	Off	N	10.3	25.0	46.0
3.987500	22.4	9.000	Off	N	10.3	23.6	46.0
4.001000	21.3	9.000	Off	N	10.3	24.7	46.0
4.050500	23.1	9.000	Off	N	10.3	22.9	46.0
19.782500	21.9	9.000	Off	N	11.2	28.1	50.0
19.823000	23.2	9.000	Off	N	11.2	26.8	50.0
19.998500	21.8	9.000	Off	N	11.2	28.2	50.0
20.039000	22.0	9.000	Off	N	11.2	28.0	50.0
21.335000	23.2	9.000	Off	N	11.3	26.8	50.0
24.039500	23.0	9.000	Off	N	11.5	27.0	50.0

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## 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	: 21.1°C
Humidity Level	: 30.7 %
Test Date	: January 13, 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)			
125.00	16.39	V	1.17	12.01	3.90	43.5	32.3	11.2
625.00	13.94	V	1.00	19.97	5.39	46.0	39.3	6.7



### -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 : 22.3°C

Humidity Level : 29.6 %

Test Date : January 14, 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)
1.3284	50.0	74	24.0	V	26.8	54	27.2
2.0165	54.8	74	19.2	V	30.3	54	23.7
2.0917	52.5	74	21.5	V	29.2	54	24.8
2.6662	53.5	74	20.5	V	31.3	54	22.7

※ **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 and WLAN, FCC ID: ZNFD405, Model: LG-D405** complies with §15.107 and §15.109 of the FCC rules.