

EMI CERTIFICATION REPORT

Applicant:**LG Electronics MobileComm U.S.A., Inc.****1000 Sylvan Avenue, Englewood Cliffs NJ 07632****Date of Issue: March 25, 2014****Test Report No.: HCT-E-1403-F029****Test Site: HCT CO., LTD.****HCT FRN: 0005-8664-21****FCC ID:****ZNFD410H**

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : Cellular/PCSGSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/
HSPA+ Phone with Bluetooth and WLAN
Model Name : LG-D410h
Additional Model Name : D410h, D410H, LGD410h, LGD410H, LG-D410H
Port / Connector(s) : USB / Earphone Port
Date of Test : March 06, 2014 - March 10, 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

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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1403-F029	March 25, 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	LG-D410h
FCC ID	ZNFD410H
Additional Model	D410h, D410H, LGD410h, LGD410H, LG-D410H
EUT Type	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/ HSPA+ Phone with Bluetooth and WLAN
TX Frequency	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)
RX Frequency	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

Device Type	Model Name	Manufacturer	FCC ID / DoC	Connected To
EUT	LG-D410h	LG	ZNFD410H	Notebook PC Ear-phone
USB cable	EAD62377902	Ningbo Broad	-	E.U.T Notebook PC
Ear-phone	EAB62209202	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



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



2. DESCRIPTION OF TEST

2.1 Conducted Emission Test

Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.

Preliminary Conducted emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3

[Conducted Emission Limits]

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

*Decreases with the logarithm of the frequency.



2.2 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.

Peak measurements were made over the changeable frequency range 30 MHz to 1 GHz at a measurement distance of 3 m for the following antenna and turntable arrangements:

Antenna Height (m)	Antenna Polarization	RBW	VBW	Turntable Position (Degrees)
1 to 4	Horizontal, Vertical	120 kHz	300 kHz	Continuous

Final measurements were made using Quasi-Peak detectors.

[Radiated Emission Limits]

Frequency (MHz)	Field Strength ($\mu V/m$)	Quasi-Peak (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

Peak and Average measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5th harmonics of the highest frequency in accordance with internal maximum operating frequency at a measurement distance of 3 m for the following antenna and turntable arrangements:

Antenna Height (m)	Antenna Polarization	RBW	VBW	Turntable Position (Degrees)
1 to 4	Horizontal, Vertical	1 MHz (PK / AV)	3 MHz (PK) 10 Hz (AV)	Continuous

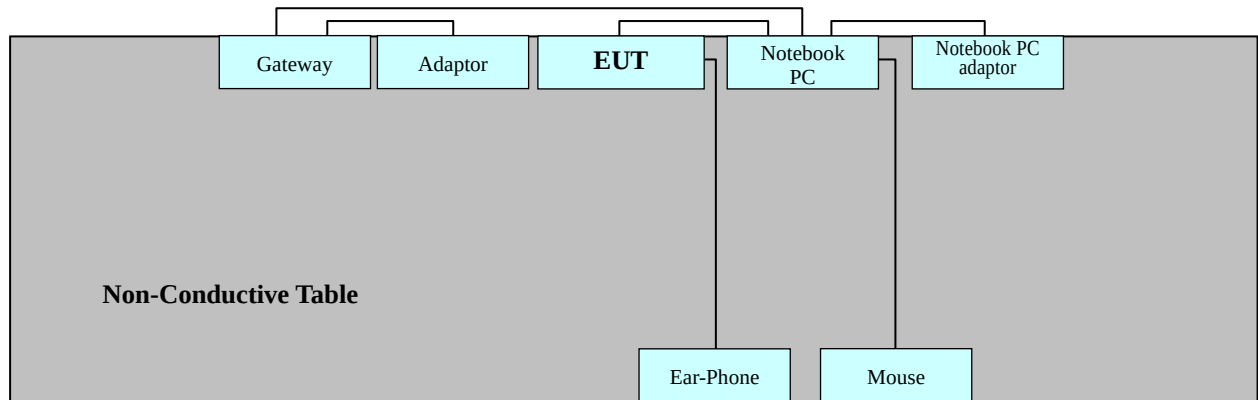
Final measurements were made using Peak and Average detectors.

[Radiated Emission Limits]

Frequency (MHz)	Peak (dB $\mu V/m$)	Average (dB $\mu V/m$)
1 000 to 12 000	74	54



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, Average (6 dB Bandwidth: 9 kHz)
Operation Mode	: Data Communication mode
Temperature	: 22.6°C
Humidity Level	: 25.3 %
Test Date	: March 10, 2014

Frequency (MHz)	Corr. (dB)	Conductor	Quasi-Peak			Average		
			Limit (dBuV)	Measurement Level (dBuV)	Result Level (dBuV)	Limit (dBuV)	Measurement Level (dBuV)	Result Level (dBuV)
0.1950	9.7	N	63.8	39.3	49.0	53.8	-	-
0.1950	9.7	L1	63.8	40.2	49.9	53.8	-	-
0.2040	9.7	L1	63.4	39.5	49.2	53.4	-	-
4.3205	10.1	N	56.0	-	-	46.0	20.4	30.5

※ **NOTE:** Refer to page 13 to page 16 for details.

1. Conductor L1 = 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 'CAverage' of the test data



EMI Auto Test(1)

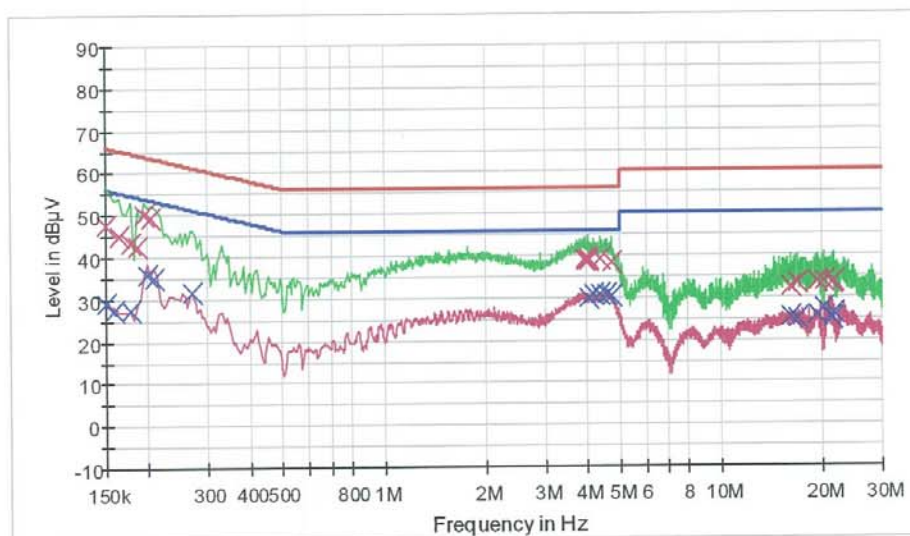
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HCT TEST Report

Common Information

EUT: LG-D410h
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: DATA MODE
 Operator Name:

FCC CLASS B



— FCCCLASS B_QP — Preview Result 2-AVG
 — FCCCLASS B_AV — Final Result 1-CPK
 — Preview Result 1-PK — Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	47.6	9.000	Off	L1	9.7	18.4	66.0
0.163500	45.0	9.000	Off	L1	9.7	20.3	65.3
0.177000	43.4	9.000	Off	L1	9.7	21.2	64.6
0.186000	42.3	9.000	Off	L1	9.7	21.9	64.2
0.195000	49.9	9.000	Off	L1	9.7	13.9	63.8
0.204000	49.2	9.000	Off	L1	9.7	14.2	63.4
3.965000	39.3	9.000	Off	L1	10.1	16.7	56.0
3.974000	38.9	9.000	Off	L1	10.1	17.1	56.0
4.037000	39.4	9.000	Off	L1	10.1	16.6	56.0
4.046000	38.9	9.000	Off	L1	10.1	17.1	56.0
4.388000	39.0	9.000	Off	L1	10.1	17.0	56.0
4.743500	38.1	9.000	Off	L1	10.1	17.9	56.0
16.142000	32.6	9.000	Off	L1	10.8	27.4	60.0
16.853000	33.1	9.000	Off	L1	10.8	26.9	60.0
19.400000	33.9	9.000	Off	L1	10.9	26.1	60.0
20.259500	33.7	9.000	Off	L1	10.9	26.3	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)
21.461000	33.2	9.000	Off	L1	11.0	26.8	60.0
21.519500	33.7	9.000	Off	L1	11.0	26.3	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	29.0	9.000	Off	L1	9.7	27.0	56.0
0.159000	27.6	9.000	Off	L1	9.7	27.9	55.5
0.177000	27.4	9.000	Off	L1	9.7	27.2	54.6
0.199500	35.7	9.000	Off	L1	9.7	17.9	53.6
0.208500	34.8	9.000	Off	L1	9.7	18.5	53.3
0.271500	31.7	9.000	Off	L1	9.7	19.4	51.1
4.037000	30.0	9.000	Off	L1	10.1	16.0	46.0
4.046000	29.8	9.000	Off	L1	10.1	16.2	46.0
4.176500	30.7	9.000	Off	L1	10.1	15.3	46.0
4.388000	30.7	9.000	Off	L1	10.1	15.3	46.0
4.604000	30.7	9.000	Off	L1	10.1	15.3	46.0
4.743500	30.2	9.000	Off	L1	10.1	15.8	46.0
16.142000	25.2	9.000	Off	L1	10.8	24.8	50.0
16.853000	24.9	9.000	Off	L1	10.8	25.1	50.0
19.400000	25.6	9.000	Off	L1	10.9	24.4	50.0
20.259500	27.5	9.000	Off	L1	10.9	22.5	50.0
21.461000	25.0	9.000	Off	L1	11.0	25.0	50.0
21.519500	26.1	9.000	Off	L1	11.0	23.9	50.0

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EMI Auto Test(1)

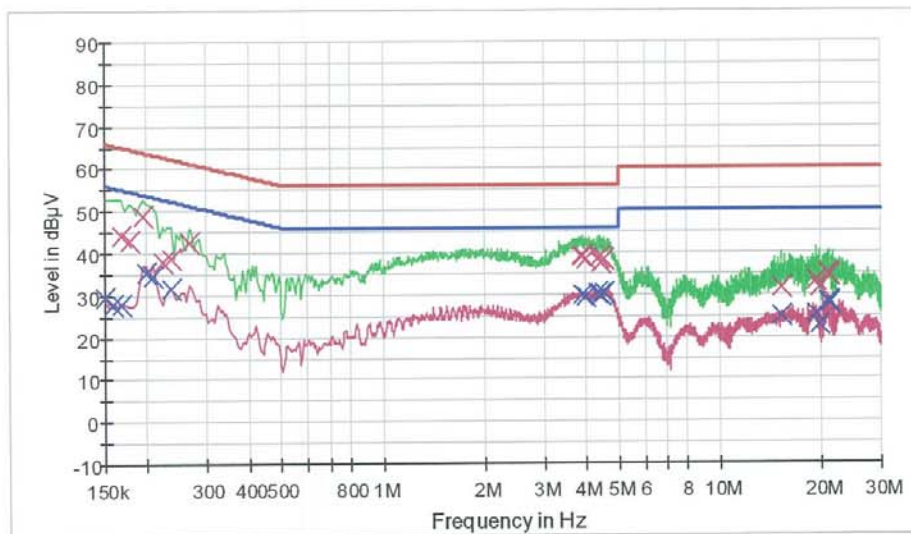
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HCT TEST Report

Common Information

EUT: LG-D410h
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: DATA MODE
 Operator Name:

FCC CLASS B



— FCCCLASS B_QP — FCCCLASS B_AV — Preview Result 1-PK
 — Preview Result 2-AVG X Final Result 1-CFK X Final Result 2-CAV

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.168000	44.3	9.000	Off	N	9.7	20.8	65.1
0.177000	42.9	9.000	Off	N	9.7	21.7	64.6
0.195000	49.0	9.000	Off	N	9.7	14.8	63.8
0.222000	38.0	9.000	Off	N	9.7	24.7	62.7
0.235500	38.6	9.000	Off	N	9.7	23.7	62.3
0.267000	42.7	9.000	Off	N	9.7	18.5	61.2
3.848000	39.2	9.000	Off	N	10.1	16.8	56.0
3.911000	39.0	9.000	Off	N	10.1	17.0	56.0
4.005500	38.2	9.000	Off	N	10.1	17.8	56.0
4.388000	38.5	9.000	Off	N	10.1	17.5	56.0
4.419500	37.6	9.000	Off	N	10.1	18.4	56.0
4.532000	38.2	9.000	Off	N	10.1	17.8	56.0
15.215000	31.7	9.000	Off	N	10.7	28.3	60.0
19.251500	33.2	9.000	Off	N	10.8	26.8	60.0
19.674500	31.7	9.000	Off	N	10.8	28.3	60.0
20.952500	34.9	9.000	Off	N	10.8	25.1	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)
21.024500	34.5	9.000	Off	N	10.8	25.5	60.0
21.231500	34.6	9.000	Off	N	10.8	25.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	29.5	9.000	Off	N	9.7	26.5	56.0
0.159000	27.7	9.000	Off	N	9.7	27.8	55.5
0.168000	27.6	9.000	Off	N	9.7	27.5	55.1
0.199500	35.3	9.000	Off	N	9.7	18.3	53.6
0.208500	34.5	9.000	Off	N	9.7	18.8	53.3
0.235500	31.7	9.000	Off	N	9.7	20.6	52.3
3.911000	29.7	9.000	Off	N	10.1	16.3	46.0
4.005500	29.6	9.000	Off	N	10.1	16.4	46.0
4.014500	29.7	9.000	Off	N	10.1	16.3	46.0
4.320500	30.5	9.000	Off	N	10.1	15.5	46.0
4.419500	29.9	9.000	Off	N	10.1	16.1	46.0
4.532000	30.3	9.000	Off	N	10.1	15.7	46.0
15.215000	24.7	9.000	Off	N	10.7	25.3	50.0
19.251500	25.3	9.000	Off	N	10.8	24.7	50.0
19.674500	22.6	9.000	Off	N	10.8	27.4	50.0
20.952500	28.1	9.000	Off	N	10.8	21.9	50.0
21.024500	28.3	9.000	Off	N	10.8	21.7	50.0
21.231500	27.8	9.000	Off	N	10.8	22.2	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.

- Measurement for 30 MHz to 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 : 19.9°C

Humidity Level : 23.6 %

Test Date : March 06, 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)			
58.60	17.88	V	1.0	11.88	3.53	40.0	33.3	6.7
125.00	17.59	V	1.7	12.01	3.90	43.5	33.5	10.0
625.00	11.74	V	1.0	19.97	5.39	46.0	37.1	8.9



- Measurement for 1 GHz to 12 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

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

Operation Mode : Data Communication mode

Temperature : 19.9°C

Humidity Level : 23.6 %

Test Date : March 06, 2014

Frequency (GHz)	Polarity (H/V)	Antenna Height (m)	Peak			Average		
			Total (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Total (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1.3289	V	1.0	51.1	74	22.9	28.0	54	26.0
1.9956	V	1.0	57.8	74	16.2	31.8	54	22.2
2.6622	V	1.0	49.9	74	24.1	31.0	54	23.0



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 $21.5 \text{ dB}\mu\text{V}$ is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The $30 \text{ dB}\mu\text{V/m}$ value is mathematically converted to its corresponding level in $\mu\text{V/m}$.

$$FS = 21.5 + 7.4 + 1.1 = 30 \text{ dB}\mu\text{V/m}$$



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>
<u>Conducted Emission</u>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2015.01.24
☒ LISN	EMCO	3816/2SH	9706-1070	1 year	2014.04.26
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	2015.01.29
☐ 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

-For measurement below 1 GHz

☒ 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	-

-For measurement above 1 GHz

☒ 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
☐ Power Amplifier	CERNEX	CBLU1183540	22964	1 year	2014.07.24
☒ 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	-
☐ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	2014.07.24



7. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSD PA/HSUPA/HSPA+ Phone with Bluetooth and WLAN, FCC ID: ZNFD410H, Model: LG-D410h** complies with §15.107 and §15.109 of the FCC rules.