

EMI CERTIFICATION REPORT

Applicant:**LG Electronics MobileComm U.S.A., Inc.****1000 Sylvan Avenue, Englewood Cliffs NJ 07632****Date of Issue: March 28, 2014****Test Report No.: HCT-E-1403-F035****Test Site: HCT CO., LTD.****HCT FRN: 0005-8664-21****FCC ID:****ZNFD321**

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : Cellular/PCS GSM/WCDMA Phone with Bluetooth and WLAN
Model Name : LG-D321
Additional Model Name : D321, LGD321, LGL42G, L42G
Port / Connector(s) : USB / Earphone Port
Date of Test : March 25, 2014 - March 26, 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-F035	March 28, 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-D321
FCC ID	ZNFD321
Additional Model	D321, LGD321, LGL42G, L42G
EUT Type	Cellular/PCS GSM/WCDMA 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 equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Manufacturer	FCC ID / DoC	Connected To
EUT	LG-D321	LG	ZNFD321	Notebook PC Ear-phone
USB cable	EAD62377902	Ningbo Broad	-	E.U.T Notebook PC
USB cable	EAD62377901	IS	-	E.U.T Notebook PC
Ear-phone	EAB62808402	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)1.2
	Ear-phone	N/A	N	(D)1.0
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

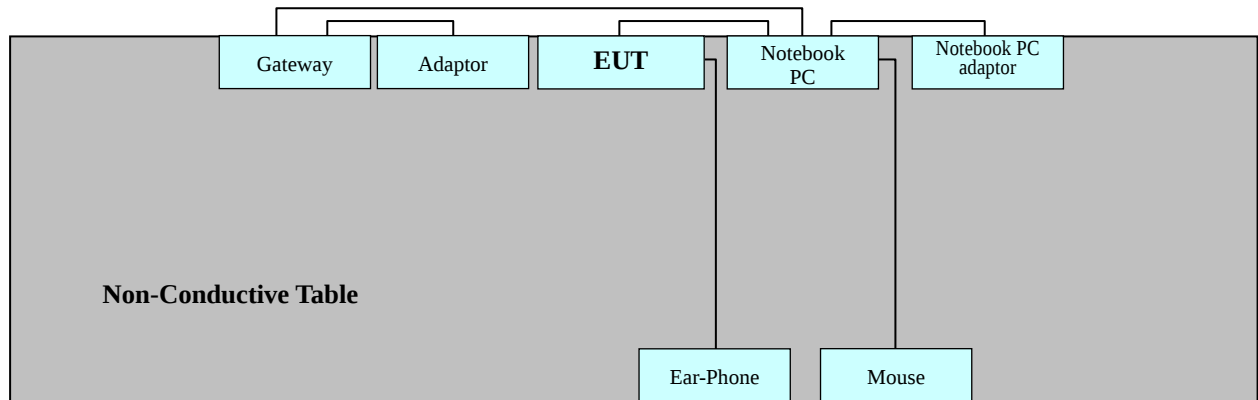
Final measurements were made using Peak and Average detectors.

[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
USB cable Manufacturer	: Ningbo Broad
Temperature	: 22.4°C
Humidity Level	: 37.9 %
Test Date	: March 26, 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	41.4	51.1	53.8	25.7	35.4
0.1995	9.7	L1	63.6	41.3	51.0	53.6	-	-
0.2040	9.7	N	63.4	41.1	50.8	53.4	26.1	35.8
4.6040	10.1	L1	56.0	29.8	39.9	46.0	21.7	31.8

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

1. The worst-case emissions are reported.
 2. Conductor L1 = Hot, Conductor N = Neutral
 3. Corr. = LISN Factor + Cable Loss Factor
 4. 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(2)

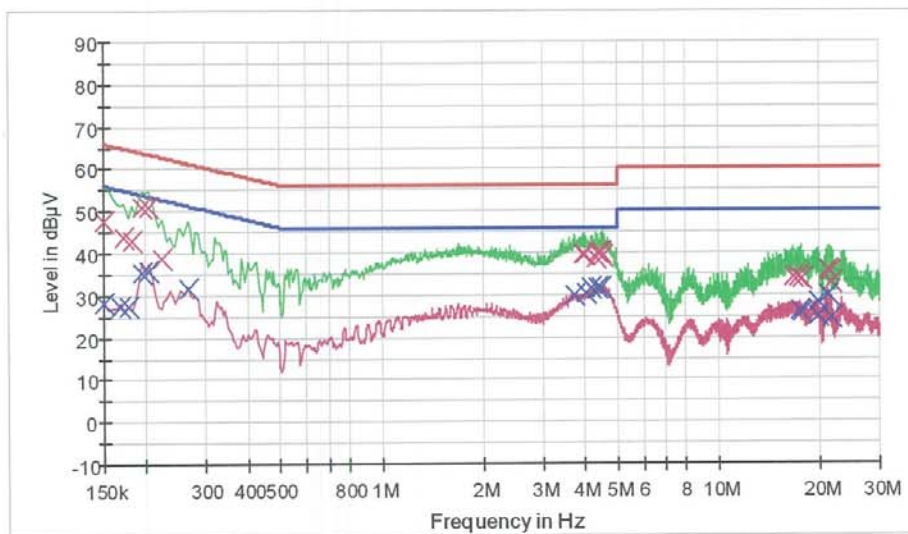
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HCT TEST Report

Common Information

EUT: LG-D321
 Manufacturer: LG
 Test Site: SHIELD ROOM
 Operating Conditions: DATA MODE (BROAD)
 Operator Name:

FCC CLASS B



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

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	47.7	9.000	Off	N	9.7	18.3	66.0
0.172500	43.8	9.000	Off	N	9.7	21.0	64.8
0.181500	42.9	9.000	Off	N	9.7	21.5	64.4
0.195000	51.1	9.000	Off	N	9.7	12.7	63.8
0.204000	50.8	9.000	Off	N	9.7	12.6	63.4
0.222000	38.8	9.000	Off	N	9.7	23.9	62.7
3.965000	39.6	9.000	Off	N	10.1	16.4	56.0
3.978500	39.5	9.000	Off	N	10.1	16.5	56.0
4.320500	38.8	9.000	Off	N	10.1	17.2	56.0
4.388000	40.1	9.000	Off	N	10.1	15.9	56.0
4.460000	39.9	9.000	Off	N	10.1	16.1	56.0
4.532000	39.2	9.000	Off	N	10.1	16.8	56.0
16.637000	34.0	9.000	Off	N	10.7	26.0	60.0
17.132000	34.0	9.000	Off	N	10.7	26.0	60.0
17.699000	33.9	9.000	Off	N	10.7	26.1	60.0
21.168500	35.9	9.000	Off	N	10.8	24.1	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
21.312500	35.2	9.000	Off	N	10.8	24.8	60.0
21.524000	32.9	9.000	Off	N	10.9	27.1	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	28.2	9.000	Off	N	9.7	27.8	56.0
0.168000	27.3	9.000	Off	N	9.7	27.8	55.1
0.177000	27.3	9.000	Off	N	9.7	27.3	54.6
0.195000	35.4	9.000	Off	N	9.7	18.4	53.8
0.204000	35.8	9.000	Off	N	9.7	17.6	53.4
0.267000	31.7	9.000	Off	N	9.7	19.5	51.2
3.753500	29.9	9.000	Off	N	10.0	16.1	46.0
4.041500	30.4	9.000	Off	N	10.1	15.6	46.0
4.176500	31.6	9.000	Off	N	10.1	14.4	46.0
4.388000	31.6	9.000	Off	N	10.1	14.4	46.0
4.460000	31.5	9.000	Off	N	10.1	14.5	46.0
4.491500	31.5	9.000	Off	N	10.1	14.5	46.0
17.415500	26.2	9.000	Off	N	10.7	23.8	50.0
17.699000	25.8	9.000	Off	N	10.7	24.2	50.0
19.683500	25.0	9.000	Off	N	10.8	25.0	50.0
19.710500	28.2	9.000	Off	N	10.8	21.8	50.0
21.168500	30.1	9.000	Off	N	10.8	19.9	50.0
21.591500	24.3	9.000	Off	N	10.9	25.7	50.0

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EMI Auto Test(2)

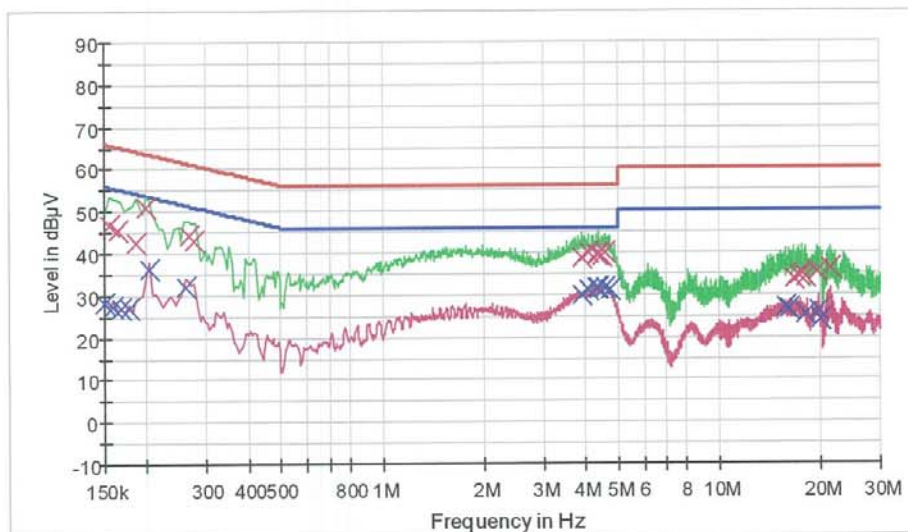
1 / 2

HCT TEST Report

Common Information

EUT: LG-D321
Manufacturer: LG
Test Site: SHIELD ROOM
Operating Conditions: DATA MODE (BROAD)
Operator Name:

FCC CLASS B



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

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.154500	46.8	9.000	Off	L1	9.7	19.0	65.8
0.163500	45.6	9.000	Off	L1	9.7	19.7	65.3
0.186000	42.6	9.000	Off	L1	9.7	21.6	64.2
0.199500	51.0	9.000	Off	L1	9.7	12.6	63.6
0.267000	44.1	9.000	Off	L1	9.7	17.1	61.2
0.276000	43.1	9.000	Off	L1	9.7	17.8	60.9
3.897500	38.9	9.000	Off	L1	10.1	17.1	56.0
4.109000	40.1	9.000	Off	L1	10.1	15.9	56.0
4.320500	39.7	9.000	Off	L1	10.1	16.3	56.0
4.392500	39.5	9.000	Off	L1	10.1	16.5	56.0
4.464500	39.2	9.000	Off	L1	10.1	16.8	56.0
4.604000	39.9	9.000	Off	L1	10.1	16.1	56.0
16.578500	33.5	9.000	Off	L1	10.8	26.5	60.0
17.285000	34.6	9.000	Off	L1	10.8	25.4	60.0
17.708000	34.8	9.000	Off	L1	10.8	25.2	60.0
17.924000	34.1	9.000	Off	L1	10.8	25.9	60.0

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EMI Auto Test(2)

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Frequency (MHz)	QuasiPeak (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
19.620500	35.2	9.000	Off	L1	10.9	24.8	60.0
21.389000	36.2	9.000	Off	L1	11.0	23.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	28.2	9.000	Off	L1	9.7	27.8	56.0
0.159000	27.2	9.000	Off	L1	9.7	28.3	55.5
0.168000	26.9	9.000	Off	L1	9.7	28.2	55.1
0.177000	26.9	9.000	Off	L1	9.7	27.7	54.6
0.204000	36.2	9.000	Off	L1	9.7	17.2	53.4
0.262500	31.8	9.000	Off	L1	9.7	19.6	51.4
3.897500	30.0	9.000	Off	L1	10.1	16.0	46.0
4.109000	31.1	9.000	Off	L1	10.1	14.9	46.0
4.320500	31.6	9.000	Off	L1	10.1	14.4	46.0
4.392500	31.7	9.000	Off	L1	10.1	14.4	46.0
4.604000	31.8	9.000	Off	L1	10.1	14.2	46.0
4.743500	31.0	9.000	Off	L1	10.1	15.0	46.0
15.723500	27.0	9.000	Off	L1	10.7	23.0	50.0
16.083500	26.6	9.000	Off	L1	10.7	23.4	50.0
18.014000	25.1	9.000	Off	L1	10.8	24.9	50.0
19.760000	26.0	9.000	Off	L1	10.9	24.0	50.0
19.904000	24.2	9.000	Off	L1	10.9	25.8	50.0
19.976000	24.1	9.000	Off	L1	10.9	25.9	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

USB cable Manufacturer : IS

Temperature : 21.5°C

Humidity Level : 34.1 %

Test Date : March 25, 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)			
58.2	13.86	V	1.0	11.91	3.53	40.0	29.3	10.7
125.0	18.99	V	1.0	12.01	3.90	43.5	34.9	8.6
140.8	19.87	H	3.2	12.75	3.97	43.5	36.6	6.9
259.2	18.24	H	1.3	12.07	4.39	46.0	34.7	11.3

※ NOTE:

1. The worst-case emissions are reported.



- 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

USB cable Manufacturer : Ningbo Broad

Temperature : 21.5°C

Humidity Level : 34.1 %

Test Date : March 25, 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)
1.9930	V	1.5	50.1	74	23.9	33.8	54	20.2
2.4974	V	1.7	42.2	74	31.8	30.0	54	24.0
2.6594	V	1.0	52.8	74	21.2	34.4	54	19.6

※ NOTE:

1. The worst-case emissions are reported.



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 μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB are added. The 30 dB μ V/m value is mathematically converted to its corresponding level in μ 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	21691	1 year	2014.07.24
☐ 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	-



7. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS GSM/WCDMA Phone with Bluetooth and WLAN, FCC ID: ZNFD321, Model: LG-D321** complies with §15.107 and §15.109 of the FCC rules.