

EMI TEST REPORT

FCC CERTIFICATION

Applicant:

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

Date of Receipt: April 18, 2016

Date of Issue: April 29, 2016

Test Report No. HCT-E-1604-F040

HCT FRN: 0005866421

FCC ID :

ZNFK210

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: Multi-band GSM/EDGE/WCDMA/LTE Phone with WLAN and Bluetooth

Model Name: LG-K210

Additional Model Name: LGK210, K210, LG-K450, LGK450, K450

Test Port: Micro USB / Earphone Port

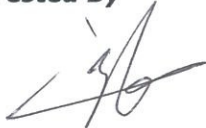
Date of Test: April 22, 2016 - April 23, 2016

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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Reviewed By



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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1604-F040	April 29, 2016	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-K210
FCC ID	ZNFK210
Additional Model	LGK210, K210, LG-K450, LGK450, K450
EUT Type	Multi-band GSM/EDGE/WCDMA/LTE Phone with WLAN and Bluetooth
TX Frequency	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 B2) 1712.4 MHz to 1752.6 MHz (WCDMA B4) 826.40 MHz to 846.60 MHz (WCDMA B5) 1 850.7 MHz to 1 909.3 MHz (LTE B2) 1 710 MHz to 1 755 MHz (LTE B4) 824 MHz to 849 MHz (LTE B5) 699 MHz to 716 MHz (LTE B12) 704 MHz to 716 MHz (LTE B17)
RX Frequency	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 B2) 2 112.4 MHz to 2 152.6 MHz (WCDMA B4) 871.40 MHz to 891.60 MHz (WCDMA B5) 1 930.00 MHz to 1 990.00MHz (LTE B2) 2 110 MHz to 2 155 MHz (LTE B4) 869 MHz to 894 MHz (LTE B5) 729 MHz to 746 MHz (LTE B12) 734 MHz to 746 MHz (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, KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2003.

Measurement Facilities	Reg. No.
HCT FRN: 0005866421 Radiated Field strength measurement facility (3 m)	90661 (February 28, 2014)
HCT FRN: 0005866421 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-K210	LG	ZNFK210	Notebook PC, Earphone
USB cable	EAD63769702	Ningbo Broad	-	EUT, Notebook PC
USB cable	EAD63769701	KSD	-	EUT, Notebook PC
USB cable	EAD63769703	CRESYN	-	EUT, Notebook PC
Earphone	EAB62209201	I-Sound	-	EUT
Notebook PC	ProBook6560b	HP	DoC	EUT, Notebook PC adaptor, RJ45 cable, Serial mouse
Notebook PC adaptor	PPP009D	DELTA Electronics (Jiangsu) LTD	-	Notebook PC
Gateway	TL-WR747N	TP-LINK	-	RJ45 cable, Gateway adaptor
Gateway adaptor	T120150-2H1	TP-LINK	-	Gateway
Serial mouse	Serial 2 button mouse	Radio shack	FSUGMZE3	Notebook PC
RJ45 cable	-	-	-	Notebook PC, Gateway
Micro SD card	16 GB	Samsung	-	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	Y	(D)1.1
Notebook PC	RJ 45	N/A	N	(D)2.5
	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	EUT 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

- 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).
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to 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 kHz to 30 MHz was searched.

[Conducted Emission Limits]

Frequency (MHz)	Resolution Bandwidth (kHz)	Quasi-Peak (dB(μV))	Average (dB(μV))
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 semi-anechoic chamber. 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 GHz.
- f. The test-receiver system was set to Peak and Average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- 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 GHz)

[Radiated Emission Limits]

Frequency (MHz)	Antenna Distance (m)	Field Strength ($\mu\text{V}/\text{m}$)	Quasi-Peak (dB(μV)/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 (MHz)	Antenna Distance (m)	Peak (dB(μV)/m)	Average (dB(μV)/m)
Above 1 000	3	74	54

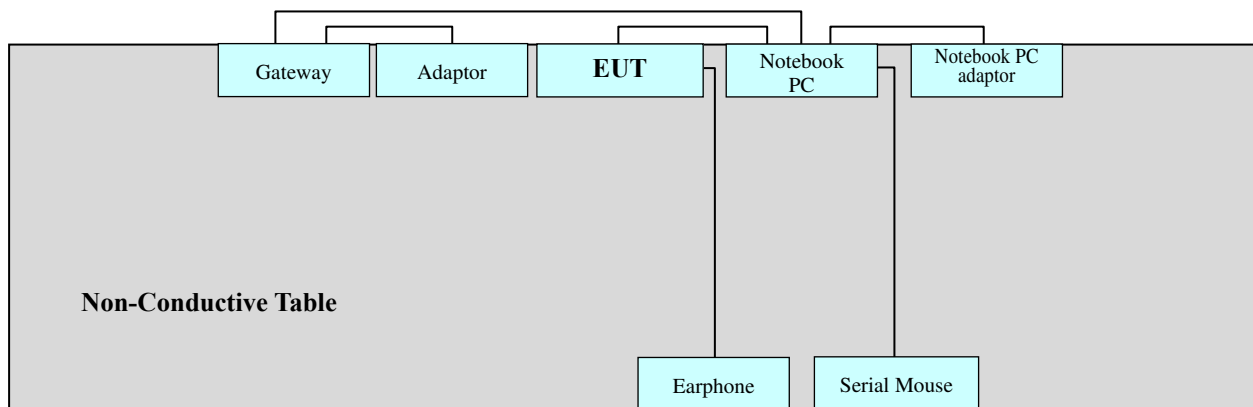


2.2.1 Frequency Range of Radiated Measurements

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 (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

2.3 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

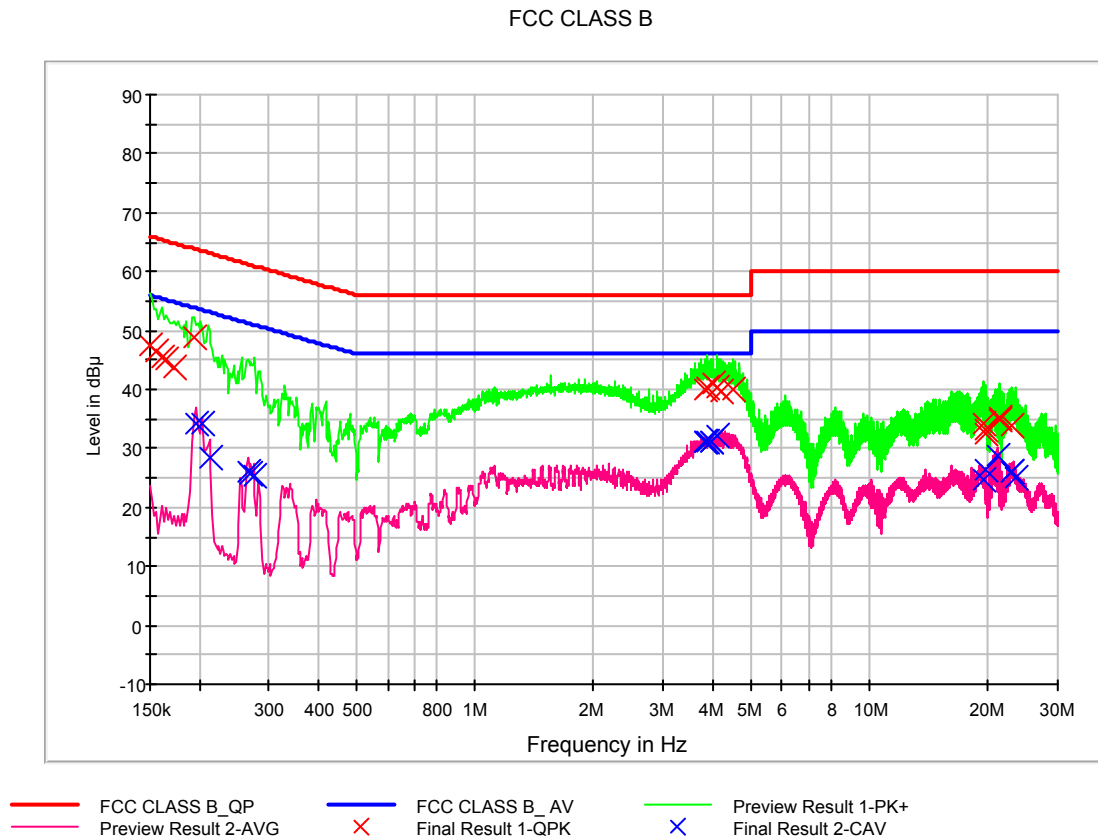
4.1 Conducted Emission Test

The test results of conducted emission at mains ports provide the following information:

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 kHz (6 dB)
Operation Mode	Data Communication mode
USB Type	CRESYN (EAD63769703) <i>*NOTE: The worst-case emissions are reported.</i>
Kind of Test Site	Shielded Room
Temperature	24.5 °C
Relative Humidity	42.5 %
Test Date	April 22, 2016

- 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

**Figure 1: Spectral Diagrams, Conducted Emission, AC Main Port, Line (L1)**



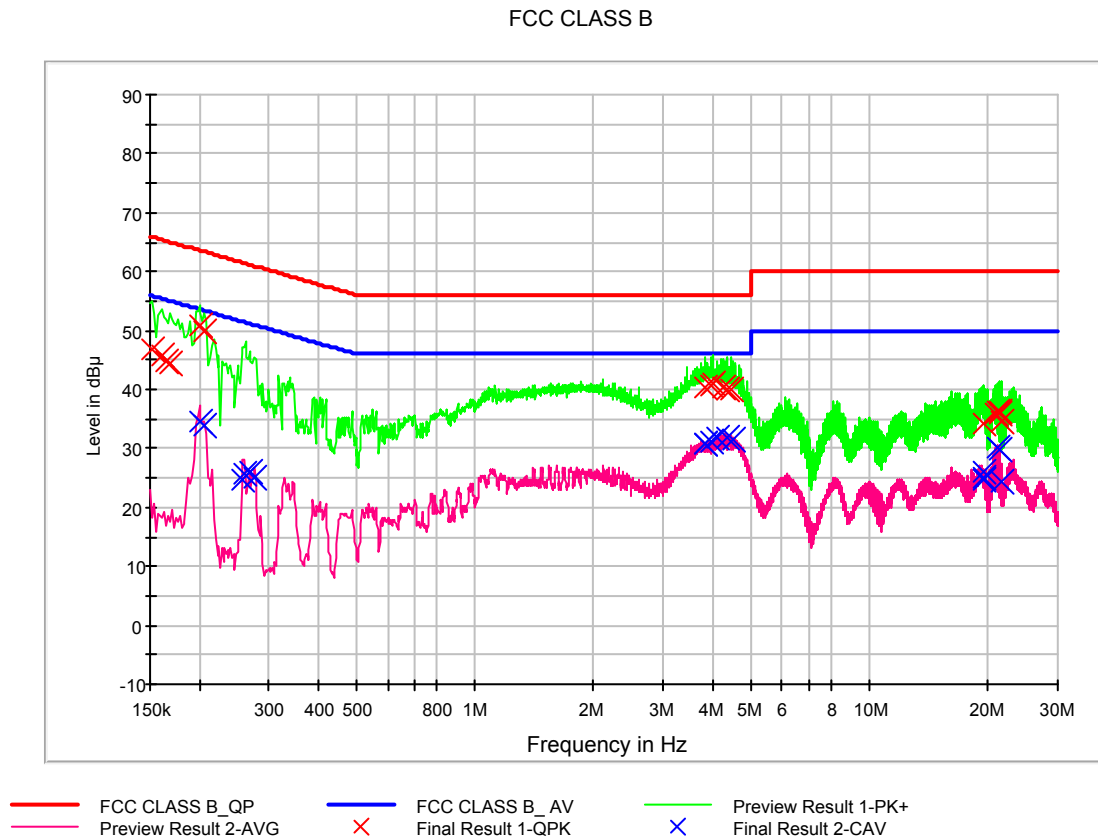
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	47.5	9.000	L1	9.7	18.5	66.0
0.156000	46.3	9.000	L1	9.6	19.3	65.7
0.160000	45.6	9.000	L1	9.6	19.9	65.5
0.164000	45.0	9.000	L1	9.6	20.3	65.3
0.172000	43.8	9.000	L1	9.6	21.1	64.9
0.194000	48.8	9.000	L1	9.6	15.0	63.9
3.814000	40.0	9.000	L1	9.8	16.0	56.0
3.884000	40.3	9.000	L1	9.8	15.7	56.0
4.024000	40.9	9.000	L1	9.8	15.1	56.0
4.098000	40.4	9.000	L1	9.8	15.6	56.0
4.222000	39.6	9.000	L1	9.8	16.4	56.0
4.518000	40.0	9.000	L1	9.9	16.0	56.0
19.556000	34.2	9.000	L1	10.2	25.8	60.0
19.708000	33.4	9.000	L1	10.2	26.6	60.0
19.768000	32.4	9.000	L1	10.2	27.6	60.0
21.248000	35.3	9.000	L1	10.3	24.7	60.0
21.324000	34.9	9.000	L1	10.3	25.1	60.0
23.018000	33.8	9.000	L1	10.3	26.2	60.0



CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.196000	34.2	9.000	L1	9.6	19.6	53.8
0.204000	34.1	9.000	L1	9.6	19.3	53.4
0.212000	28.6	9.000	L1	9.6	24.6	53.1
0.266000	26.2	9.000	L1	9.6	25.1	51.2
0.270000	25.7	9.000	L1	9.6	25.4	51.1
0.274000	25.3	9.000	L1	9.6	25.7	51.0
3.810000	31.2	9.000	L1	9.8	14.8	46.0
3.814000	31.3	9.000	L1	9.8	14.7	46.0
3.882000	31.2	9.000	L1	9.8	14.8	46.0
3.952000	31.2	9.000	L1	9.8	14.8	46.0
3.956000	31.2	9.000	L1	9.8	14.8	46.0
4.096000	32.1	9.000	L1	9.8	13.9	46.0
19.554000	24.7	9.000	L1	10.2	25.3	50.0
19.708000	26.3	9.000	L1	10.2	23.7	50.0
21.046000	28.9	9.000	L1	10.3	21.1	50.0
22.950000	26.0	9.000	L1	10.3	24.0	50.0
23.018000	26.1	9.000	L1	10.3	23.9	50.0
23.582000	24.9	9.000	L1	10.3	25.1	50.0

**Figure 2: Spectral Diagrams, Conducted Emission, AC Main Port, Line (N)**



QuasiPeak Final Result, Line (N)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	46.9	9.000	N	9.6	19.0	65.9
0.160000	45.8	9.000	N	9.6	19.7	65.5
0.164000	44.9	9.000	N	9.6	20.3	65.3
0.168000	44.3	9.000	N	9.6	20.7	65.1
0.200000	50.8	9.000	N	9.6	12.8	63.6
0.206000	49.9	9.000	N	9.6	13.5	63.4
3.812000	40.4	9.000	N	9.8	15.6	56.0
3.954000	40.5	9.000	N	9.8	15.5	56.0
4.024000	40.9	9.000	N	9.8	15.1	56.0
4.236000	40.5	9.000	N	9.8	15.5	56.0
4.378000	40.1	9.000	N	9.8	15.9	56.0
4.446000	39.9	9.000	N	9.8	16.1	56.0
19.558000	34.2	9.000	N	10.3	25.8	60.0
20.896000	35.8	9.000	N	10.3	24.2	60.0
21.114000	36.2	9.000	N	10.3	23.8	60.0
21.252000	36.2	9.000	N	10.3	23.8	60.0
21.322000	35.8	9.000	N	10.3	24.2	60.0
21.602000	34.4	9.000	N	10.3	25.6	60.0



CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.200000	34.6	9.000	N	9.6	19.0	53.6
0.206000	33.7	9.000	N	9.6	19.6	53.4
0.258000	24.7	9.000	N	9.6	26.8	51.5
0.260000	25.7	9.000	N	9.6	25.7	51.4
0.268000	25.9	9.000	N	9.6	25.3	51.2
0.276000	24.9	9.000	N	9.6	26.0	50.9
3.814000	30.9	9.000	N	9.8	15.1	46.0
3.838000	30.9	9.000	N	9.8	15.1	46.0
3.954000	31.0	9.000	N	9.8	15.0	46.0
4.094000	32.0	9.000	N	9.8	14.0	46.0
4.378000	31.8	9.000	N	9.8	14.2	46.0
4.518000	31.4	9.000	N	9.8	14.6	46.0
19.416000	26.1	9.000	N	10.3	23.9	50.0
19.554000	24.9	9.000	N	10.3	25.1	50.0
19.558000	24.9	9.000	N	10.3	25.1	50.0
21.112000	30.2	9.000	N	10.3	19.8	50.0
21.250000	29.7	9.000	N	10.3	20.3	50.0
21.602000	24.4	9.000	N	10.3	25.6	50.0



4.2 Radiated Emission Test

The test results of radiated emission provide the following information:

-For Measurement Below 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Operation Mode	Data Communication mode
USB Type	CRESYN (EAD63769703) <i>*NOTE: The worst-case emissions are reported.</i>
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.9 °C
Relative Humidity	42.0 %
Test Date	April 23, 2016

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
44.167214	26.1	125.0	V	319.0	15.8	13.9	40.0
54.086653	34.2	100.0	V	104.0	15.8	5.8	40.0
58.798317	31.8	100.0	V	173.0	15.5	8.2	40.0
63.486092	34.3	100.0	V	189.0	15.0	5.7	40.0
68.493868	33.6	150.0	H	5.0	14.4	6.4	40.0
77.613307	33.1	250.0	H	81.0	12.5	6.9	40.0

- Calculation Formula:

1. POL. H = Horizontal, POL. V = Vertical
2. QuasiPeak = Reading (Receiver Reading) + Corr.
3. Corr. (Correction Factor) = Antenna Factor + Cable Loss
4. Margin = Limit - QuasiPeak



-For Measurement Above 1 GHz

Rule Part / Standard	FCC PART 15 Subpart B Class B
Detector	Peak mode: Peak (RBW: 1 MHz, VBW: 3 MHz) CISPR-Average mode: Peak (RBW: 1 MHz, VBW: 10 Hz)
Highest Operating Frequency	1.3 GHz
Testing Frequency Range	1 GHz to 6.5 GHz
Operation Mode	Data Communication mode
USB Type	CRESYN (EAD63769703) <i>*NOTE: The worst-case emissions are reported.</i>
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.9 °C
Relative Humidity	42.0 %
Test Date	April 23, 2016

Frequency (MHz)	Peak (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1330.811624	51.7	134.0	V	113.0	-9.8	22.3	74.0
1399.949900	49.4	100.0	V	198.0	-9.6	24.6	74.0
1998.146293	53.2	100.0	V	241.0	-8.4	20.8	74.0

Frequency (MHz)	CAverage (dBμV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1330.811624	32.3	134.0	V	113.0	-9.8	21.7	54.0
1399.949900	46.7	100.0	V	198.0	-9.6	7.3	54.0
1998.146293	35.8	100.0	V	241.0	-8.4	18.2	54.0

- Calculation Formula:

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



5. LIST OF TEST EQUIPMENT

<u>Type</u>	<u>Manufacturer</u>	<u>Model Name</u>	<u>Serial Number</u>	<u>Calibration Cycle</u>	<u>CAL Date</u>
<u>Conducted Emission</u>					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	12.28.2015
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.11.2015
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	12.28.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	03.30.2016
☒ Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	11.17.2014
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.05.2015
☐ 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 GHz					
☒ EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	03.30.2016
☒ Antenna master	HD GmbH	MA240	240/520	N/A	-
☒ Antenna master controller	HD GmbH	HD 100	100/637	N/A	-
☒ Turn Table	EMCO	1060-2M	-	N/A	-
☒ Turn Table controller	EMCO	2090	9702-1224	N/A	-
☐ Power Amplifier	CERNEX	CBLU1183540	21691	1 year	07.06.2015
☒ Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.15.2015
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	06.05.2015
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT Type: Multi-band GSM/EDGE/WCDMA/LTE Phone with WLAN and Bluetooth, Model: LG-K210, FCC ID: ZNFK210** complies with §15.107 and §15.109 of the FCC rules.