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EMI TEST REPORT
FCC CERTIFICATION

Applicant: **LG Electronics MobileComm U.S.A., Inc.** **1000 Sylvan Avenue, Englewood Cliffs NJ 07632**	**Date of Receipt: August 29, 2016** **Date of Issue: September 27, 2016** **Test Report No. HCT-E-1609-F001-1** **HCT FRN: 0005866421**

FCC ID : **ZNFG420**

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:	GSM Phone with Bluetooth
Model Name:	LG-G420
Test Port:	Micro USB / Earphone Port
Date of Test:	August 31, 2016, September 27, 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 C63.4-2014. (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

Jea-Woong Lee
Test Engineer
EMC Team
Certification Division

Reviewed By

Jin-Pyo Hong
Technical Manager
EMC Team
Certification Division

DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1609-F001	September 05, 2016	Initial Release
HCT-E-1609-F001-1	September 27, 2016	Revised in section 4.2 of the test report. Added in section 2(measurement uncertainty) of the test report.

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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.

FCC ID	ZNFG420
Model	LG-G420
EUT Type	GSM Phone with Bluetooth
TX Frequency	824.20 MHz to 848.80 MHz (GSM 850) 1 850.20 MHz to 1 909.80 MHz (GSM 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)

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, SOUTH KOREA. Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014.

Measurement Facilities	Reg. No.
HCT FRN: 0005866421 Radiated Field strength measurement facility (3 m)	90661 (July 07, 2015)
HCT FRN: 0005866421 Radiated Field strength measurement facility (10 m)	90661 (July 07, 2015)

1.4 Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturers recommendations for utilizing calibration equipments, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2006).

1.5 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-G420	LG	ZNFG420	Notebook PC, Earphone
USB cable	EAD62377902	Ningbo Broad	-	EUT, Notebook PC
Earphone	EAB64228801	BUJEON	-	EUT
Notebook PC	ProBook6560b	HP	DoC	EUT, Notebook PC adaptor, RJ45 cable, Serial mouse
Notebook PC adaptor	Series PPP009L-E	LITE-ON TECHNOLOGY	-	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	SanDisk	-	EUT

1.6 Cable Description

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	USB type C	Y	Y	(P,D)1.0
	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.

1.7 Noise Suppression Parts on Cable. (I/O Cable)

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	USB type C	N	N/A	Y	Both End
	Earphone	N	N/A	Y	Both End
Notebook PC	RJ 45	N	N/A	N	N/A
	Serial (Mouse)	N	N/A	Y	Notebook PC End

2. THE MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014.
All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (dB)
Conducted Emission	±1.82 dB ($k = 2$)
Radiated Emissions (30 MHz to 1 GHz)	±5.06 dB ($k = 2$)
Radiated Emissions (1 GHz to 6 GHz)	±5.0 dB ($k = 2$)
Radiated Emissions (6 GHz to 18 GHz)	±5.4 dB ($k = 2$)

3. DESCRIPTION OF TEST

3.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014

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.*

3.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014

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 detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
g. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.(1 GHz to 40 GHz)

[Radiated Emission Limits]

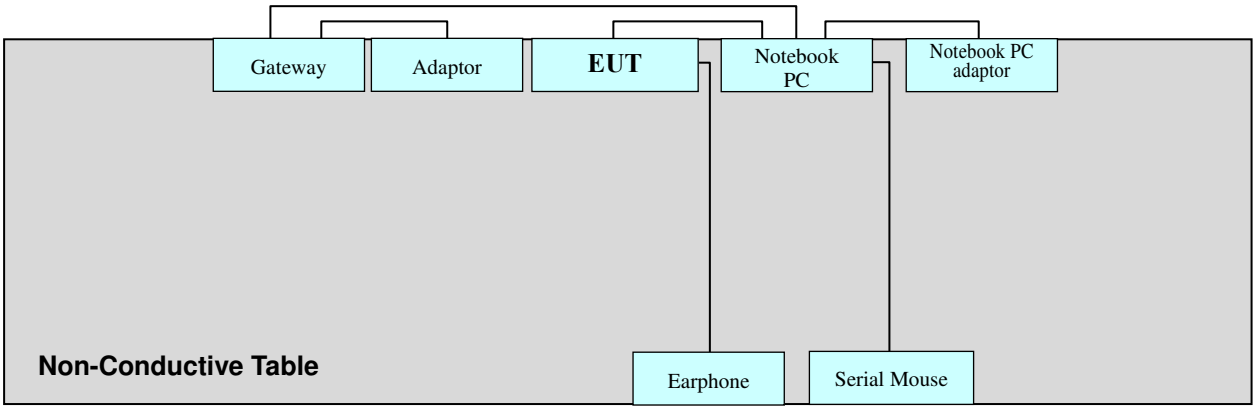
Frequency (MHz)	Antenna Distance (m)	Field Strength (μV/m)	Quasi-Peak (dB(μV)/m)
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0
Frequency (MHz)	**Antenna Distance (m)**	**Peak (dB(μV)/m)**	**Average (dB(μV)/m)**
Above 1 000	3	74	54

3.2.1 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	5th harmonic of the highest frequency or 40 ㎓, whichever is lower

3.3 Configuration of Tested System



Power Line: 120 VAC, 60 Hz

4. PRELIMINARY TEST

4.1 Conducted Emission Test

It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: ☒ Data Communication mode

4. 2 Radiated Emission Test

It was tested Data Communication mode, after connecting all peripheral devices.

Operation Mode: ☒ Data Communication mode

5. CONDUCTED AND RADIATED EMISSION TEST SUMMARY

5.1 Conducted Emission Test

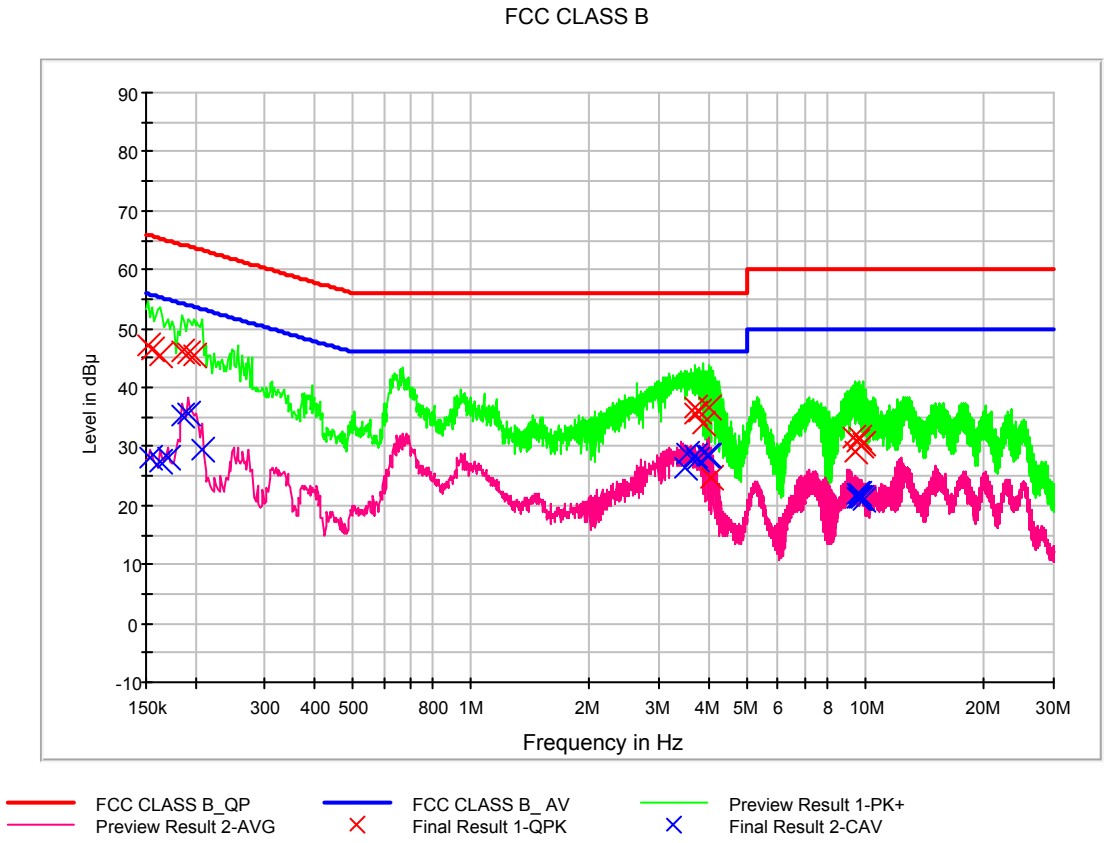
The test results of conducted emission at mains ports provide the following information:

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
Kind of Test Site	Shielded Room
Temperature	29.4 °C
Relative Humidity	48.4 %
Test Date	August 31, 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)



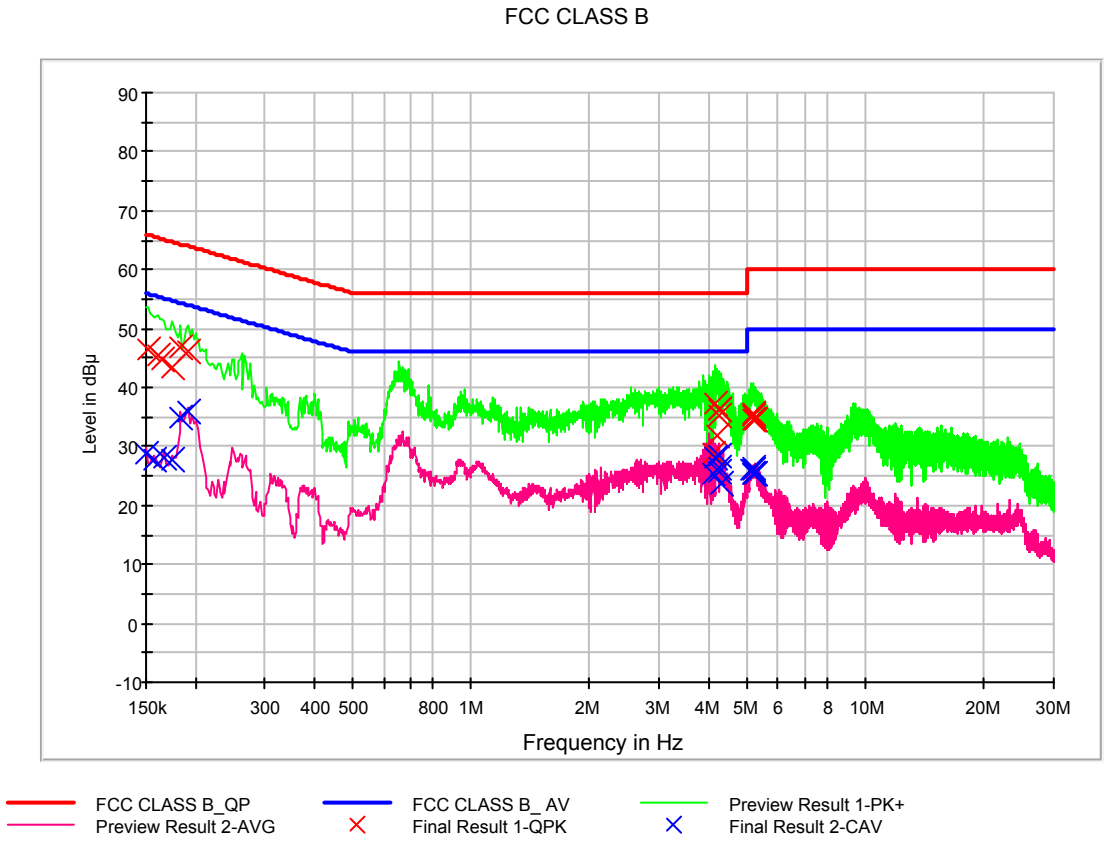
QuasiPeak Final Result, Line (L1)

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.152000	47.0	9.000	L1	9.7	18.9	65.9
0.156000	46.5	9.000	L1	9.7	19.2	65.7
0.162000	45.6	9.000	L1	9.7	19.8	65.4
0.186000	46.2	9.000	L1	9.7	18.0	64.2
0.192000	45.7	9.000	L1	9.7	18.2	63.9
0.198000	45.4	9.000	L1	9.7	18.3	63.7
3.680000	35.4	9.000	L1	9.9	20.6	56.0
3.684000	36.7	9.000	L1	9.9	19.3	56.0
3.806000	35.8	9.000	L1	9.9	20.2	56.0
3.860000	34.0	9.000	L1	9.9	22.0	56.0
4.030000	36.5	9.000	L1	9.9	19.5	56.0
4.046000	24.8	9.000	L1	9.9	31.2	56.0
9.364000	31.4	9.000	L1	10.1	28.6	60.0
9.380000	29.0	9.000	L1	10.1	31.0	60.0
9.578000	30.8	9.000	L1	10.1	29.2	60.0
9.648000	31.3	9.000	L1	10.1	28.7	60.0
9.770000	30.0	9.000	L1	10.1	30.0	60.0
9.842000	30.5	9.000	L1	10.1	29.5	60.0

CAverage Final Result, Line (L1)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	27.9	9.000	L1	9.7	27.9	55.8
0.162000	27.6	9.000	L1	9.7	27.8	55.4
0.170000	28.2	9.000	L1	9.7	26.8	55.0
0.186000	35.2	9.000	L1	9.7	19.0	54.2
0.192000	35.7	9.000	L1	9.7	18.3	53.9
0.208000	29.3	9.000	L1	9.7	23.9	53.3
3.468000	26.4	9.000	L1	9.9	19.6	46.0
3.544000	28.8	9.000	L1	9.9	17.2	46.0
3.684000	28.4	9.000	L1	9.9	17.6	46.0
3.724000	27.6	9.000	L1	9.9	18.4	46.0
3.966000	28.4	9.000	L1	9.9	17.6	46.0
4.028000	28.4	9.000	L1	9.9	17.6	46.0
9.482000	21.3	9.000	L1	10.1	28.7	50.0
9.578000	21.9	9.000	L1	10.1	28.1	50.0
9.598000	21.3	9.000	L1	10.1	28.7	50.0
9.668000	21.9	9.000	L1	10.1	28.1	50.0
9.770000	21.2	9.000	L1	10.1	28.8	50.0
9.842000	20.9	9.000	L1	10.1	29.1	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	46.6	9.000	N	9.7	19.3	65.9
0.160000	45.3	9.000	N	9.7	20.1	65.5
0.164000	44.7	9.000	N	9.7	20.6	65.3
0.174000	43.3	9.000	N	9.7	21.5	64.8
0.184000	46.7	9.000	N	9.7	17.6	64.3
0.192000	46.1	9.000	N	9.7	17.9	63.9
4.092000	28.9	9.000	N	9.9	27.1	56.0
4.136000	37.1	9.000	N	9.9	18.9	56.0
4.224000	31.8	9.000	N	9.9	24.2	56.0
4.260000	36.4	9.000	N	9.9	19.6	56.0
4.268000	36.2	9.000	N	9.9	19.8	56.0
4.274000	35.2	9.000	N	9.9	20.8	56.0
5.166000	35.4	9.000	N	9.9	24.6	60.0
5.174000	35.2	9.000	N	9.9	24.8	60.0
5.208000	34.5	9.000	N	9.9	25.5	60.0
5.216000	35.3	9.000	N	9.9	24.7	60.0
5.234000	34.7	9.000	N	9.9	25.3	60.0
5.250000	34.5	9.000	N	9.9	25.5	60.0

CAverage Final Result, Line (N)

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	28.8	9.000	N	9.7	27.2	56.0
0.158000	27.8	9.000	N	9.7	27.8	55.6
0.166000	28.2	9.000	N	9.7	27.0	55.2
0.174000	27.7	9.000	N	9.7	27.1	54.8
0.184000	35.0	9.000	N	9.7	19.3	54.3
0.192000	35.8	9.000	N	9.7	18.2	53.9
4.086000	25.2	9.000	N	9.9	20.8	46.0
4.146000	28.0	9.000	N	9.9	18.0	46.0
4.260000	28.5	9.000	N	9.9	17.5	46.0
4.268000	26.5	9.000	N	9.9	19.5	46.0
4.274000	25.6	9.000	N	9.9	20.4	46.0
4.296000	23.7	9.000	N	9.9	22.3	46.0
5.148000	26.1	9.000	N	9.9	23.9	50.0
5.166000	26.0	9.000	N	9.9	24.0	50.0
5.180000	25.2	9.000	N	9.9	24.8	50.0
5.216000	26.3	9.000	N	9.9	23.7	50.0
5.220000	25.5	9.000	N	9.9	24.5	50.0
5.250000	25.4	9.000	N	9.9	24.6	50.0

5.2 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
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.1 °C
Relative Humidity	55.5 %
Test Date	September 27, 2016

Frequency (MHz)	Quasi Peak (dBuV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
58.758317	27.0	350.0	H	185.0	22.5	13.0	40.0
66.413868	24.6	150.0	H	24.0	21.6	15.4	40.0
199.958236	26.3	134.0	V	17.0	20.0	17.2	43.5
240.339880	33.6	150.0	H	-1.0	21.7	12.4	46.0
266.514309	33.8	100.0	H	144.0	22.6	12.2	46.0
499.980842	26.6	100.0	H	15.0	28.8	19.4	46.0

- 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	360 MHz
Testing Frequency Range	1 GHz to 6 GHz
Operation Mode	Data Communication mode
Kind of Test Site	3 m semi anechoic chamber
Temperature	23.1 °C
Relative Humidity	55.5 %
Test Date	September 27, 2016

Frequency (MHz)	Peak (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1400.050100	47.8	221.4	V	8.0	-8.9	26.2	74.0
1995.941884	49.4	113.5	V	218.0	-8.4	24.6	74.0
2599.448898	46.4	290.5	V	219.0	-5.4	27.6	74.0
4072.695391	45.4	312.5	H	330.0	-2.3	28.6	74.0
5023.496994	49.3	363.0	V	215.0	1.0	24.7	74.0

Frequency (MHz)	CAverage (dBµV/m)	Antenna Height (cm)	POL. (H/V)	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1400.050100	45.1	221.4	V	8.0	-8.9	8.9	54.0
1995.941884	32.1	113.5	V	218.0	-8.4	21.9	54.0
2599.448898	31.7	290.5	V	219.0	-5.4	22.3	54.0
4072.695391	33.2	312.5	H	330.0	-2.3	20.8	54.0
5023.496994	36.7	363.0	V	215.0	1.0	17.3	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

6. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model Name	Serial Number	Calibration Cycle	CAL Date
Conducted Emission					
☒ EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	12.28.2015
☒ LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	06.09.2016
☒ LISN	Rohde & Schwarz	ENV216	100073	1 year	12.28.2015
☒ Software	Rohde & Schwarz	EMC32	-	-	-
Radiated Emission					
-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
☒ Trilog Antenna	Schwarzbeck	VULB9168	255	2 year	04.15.2015
☒ 6dB Attenuator	HP	8491A	24257	2 year	04.15.2015
☒ 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	05.27.2016
☐ 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	-
☒ Antenna master	INNCO Systems	MA4000-XP-ET	48709515	N/A	-
☒ Antenna master controller	INNCO Systems	CO 3000	CO 3000/870/ 35990515	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	07.04.2016
☒ Power Amplifier	CERNEX	CBLU5183530	24348	1 year	06.07.2016
☒ Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	10.07.2014
☐ EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	05.27.2016
☐ Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
☒ Software	Rohde & Schwarz	EMC32	-	-	-

7. CONCLUSION

The data collected shows that the **EUT Type: GSM Phone with Bluetooth, Model: LG-G420, FCC ID: ZNFG420** complies with §15.107 and §15.109 of the FCC rules.