

EMI CERTIFICATION REPORT

Applicant:

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

Date of Receipt: April 30, 2014**Date of Issue: Jun 02, 2014****Test Report No. HCT-E-1406-F001****HCT FRN: 0005866421****FCC ID:****ZNFLGL24**

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 : Cellular/PCS GSM, Cellular WCDMA, LTE Phone with Bluetooth/WLAN/NFC
Model Name : LGL24
Port : USB / Earphone Port
Date of Test : May 29, 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

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DOCUMENT HISTORY

The revision history for this document is shown in table.

Version	Date	Description
HCT-E-1406-F001	Jun 02, 2014	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	LGL24
FCC ID	ZNFLGL24
EUT Type	Cellular/PCS GSM, Cellular WCDMA, LTE Phone with Bluetooth/WLAN/NFC
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) 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) 871.40 MHz to 891.60 MHz (WCDMA 850) 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, SOUTH 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 (3 m)	90661 (February 28, 2014)
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	LGL24	LG	ZNFLGL24	Notebook PC, Earphone
USB cable	SGDY0018801	Ningbo Broad	-	EUT, Notebook PC
Earphone	SGEY0003749	CRESYN	-	EUT
Notebook PC	ProBook6560b	HP	DoC	Notebook PC adaptor
Notebook PC adaptor	PPP009D	DELTA Electronics (JIANGSU)LTD	-	Notebook PC
Gateway	MV440	Axesstel	PH7MV440	Notebook PC, Adaptor
Serial 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



1.5 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)1.0
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.

1.6 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	Both 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, Clause 7

- 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). 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	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 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 3 m shield room. 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. 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 ($\mu V/m$)	Quasi-Peak (dB $\mu V/m$)
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 $\mu V/m$)	Average (dB $\mu V/m$)
Above 1 000	3	74	54

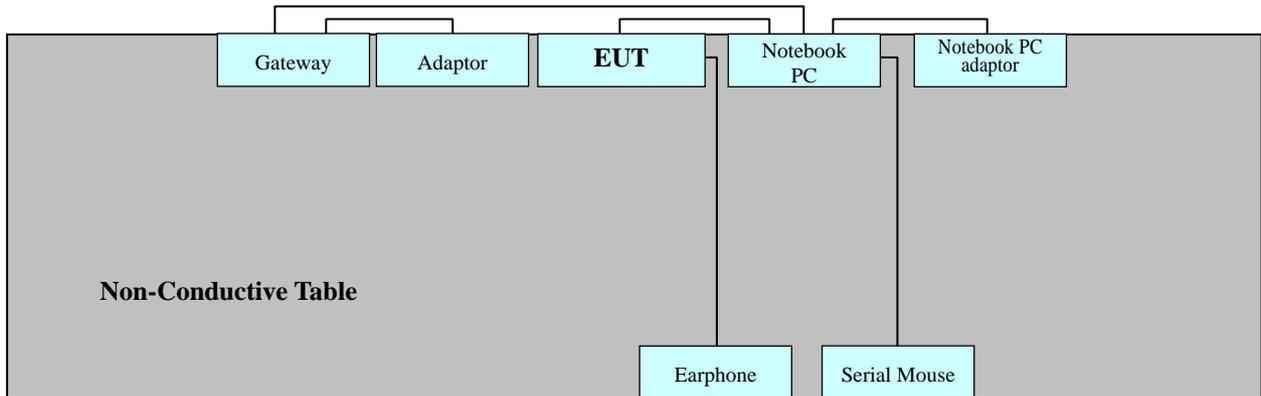


2.2.1 Frequency Range of Radiated Measurements

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

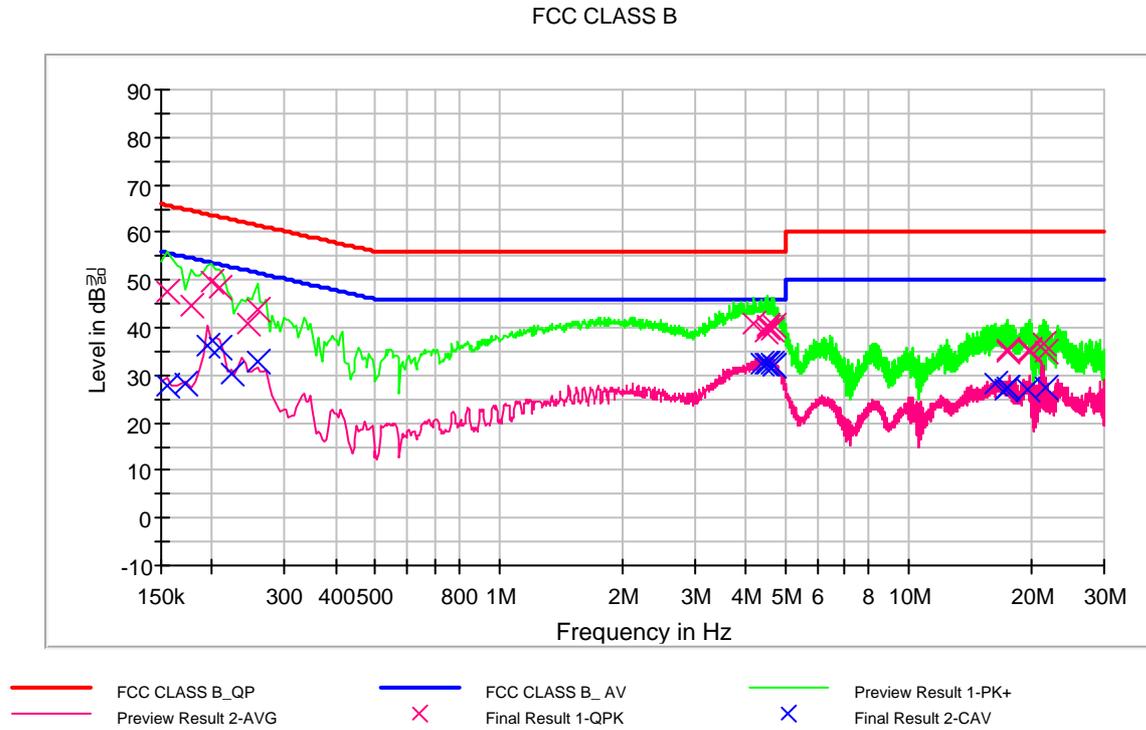
The following table shows the highest levels of conducted emissions on both polarization of hot and neutral line.

Limit Apply to	: FCC PART 15 Subpart B Class B
Detector	: Quasi-Peak, CISPR-Average
6 dB Bandwidth	: 9 kHz
Operation Mode	: Data Communication mode
Temperature	: 24.2°C
Relative Humidity	: 46.1 %
Test Date	: May 29, 2014

** NOTE: Refer to page 13 to page 18 for test data.*



Figure 1: Spectral Diagrams, Conducted Emission, Phase (L1)



※ 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



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154500	47.5	9.000	L1	9.7	18.4	65.8
0.177000	44.5	9.000	L1	9.7	20.1	64.6
0.199500	49.8	9.000	L1	9.7	13.8	63.6
0.208500	48.3	9.000	L1	9.7	15.0	63.3
0.244500	40.7	9.000	L1	9.7	21.2	61.9
0.258000	43.7	9.000	L1	9.7	17.8	61.5
4.172000	41.0	9.000	L1	10.1	15.0	56.0
4.460000	39.2	9.000	L1	10.1	16.8	56.0
4.527500	40.3	9.000	L1	10.1	15.7	56.0
4.550000	40.1	9.000	L1	10.1	15.9	56.0
4.613000	39.6	9.000	L1	10.1	16.4	56.0
4.667000	40.4	9.000	L1	10.1	15.6	56.0
17.397500	35.3	9.000	L1	10.8	24.7	60.0
17.469500	35.1	9.000	L1	10.8	24.9	60.0
19.733000	34.9	9.000	L1	10.9	25.1	60.0
19.800500	35.5	9.000	L1	10.9	24.5	60.0
21.357500	36.5	9.000	L1	11.0	23.5	60.0
21.641000	35.1	9.000	L1	11.0	24.9	60.0

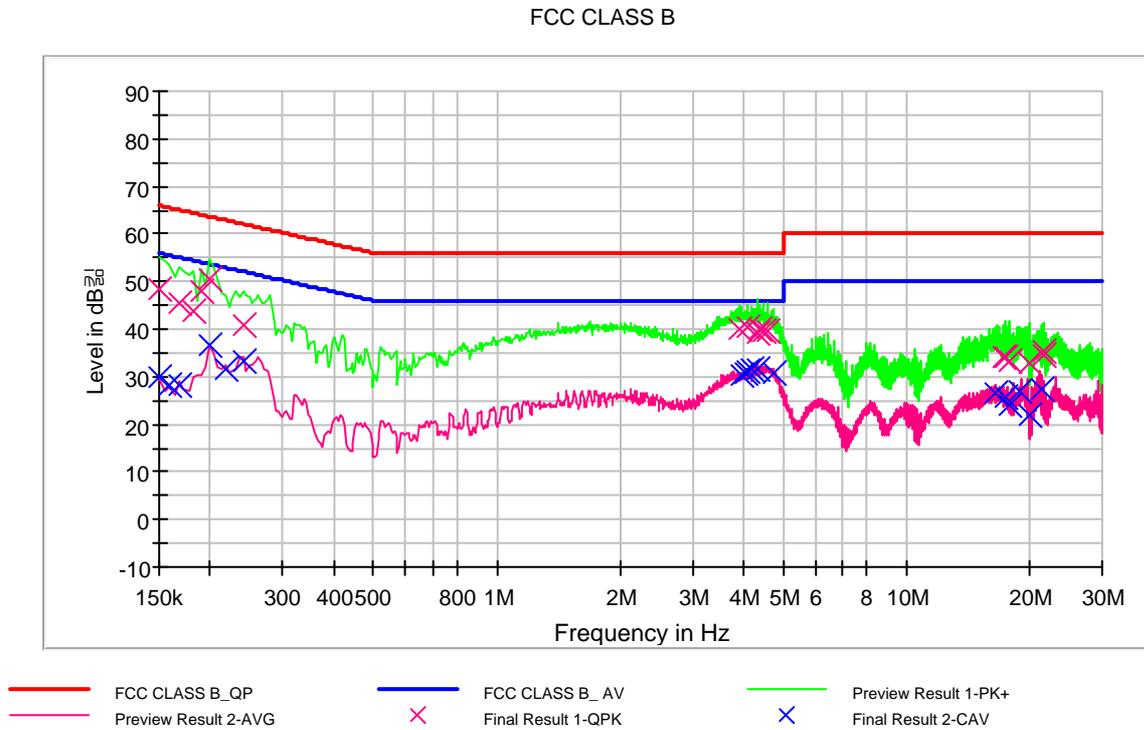


Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154500	28.0	9.000	L1	9.7	27.8	55.8
0.172500	28.3	9.000	L1	9.7	26.5	54.8
0.195000	36.4	9.000	L1	9.7	17.4	53.8
0.208500	35.6	9.000	L1	9.7	17.7	53.3
0.222000	30.4	9.000	L1	9.7	22.3	52.7
0.258000	32.8	9.000	L1	9.7	18.7	51.5
4.361000	32.5	9.000	L1	10.1	13.5	46.0
4.460000	32.3	9.000	L1	10.1	13.7	46.0
4.550000	32.3	9.000	L1	10.1	13.7	46.0
4.613000	32.3	9.000	L1	10.1	13.7	46.0
4.667000	32.0	9.000	L1	10.1	14.0	46.0
4.680500	32.0	9.000	L1	10.1	14.0	46.0
16.335500	28.1	9.000	L1	10.7	21.9	50.0
17.258000	27.2	9.000	L1	10.8	22.8	50.0
17.397500	27.3	9.000	L1	10.8	22.7	50.0
17.469500	27.3	9.000	L1	10.8	22.7	50.0
19.535000	26.8	9.000	L1	10.9	23.2	50.0
21.614000	27.6	9.000	L1	11.0	22.4	50.0



Figure 2: Spectral Diagrams, Conducted Emission, Phase (N)



※ 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



Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	48.3	9.000	N	9.7	17.7	66.0
0.168000	45.6	9.000	N	9.7	19.5	65.1
0.181500	43.8	9.000	N	9.7	20.6	64.4
0.190500	47.9	9.000	N	9.7	16.1	64.0
0.199500	50.5	9.000	N	9.7	13.1	63.6
0.240000	40.9	9.000	N	9.7	21.2	62.1
3.888500	39.9	9.000	N	10.0	16.1	56.0
4.100000	40.5	9.000	N	10.1	15.5	56.0
4.316000	39.2	9.000	N	10.1	16.8	56.0
4.383500	39.8	9.000	N	10.1	16.2	56.0
4.455500	39.7	9.000	N	10.1	16.3	56.0
4.595000	39.7	9.000	N	10.1	16.3	56.0
17.186000	34.1	9.000	N	10.7	25.9	60.0
17.397500	34.1	9.000	N	10.7	25.9	60.0
17.892500	33.4	9.000	N	10.7	26.6	60.0
19.872500	32.8	9.000	N	10.8	27.2	60.0
21.564500	35.2	9.000	N	10.9	24.8	60.0
21.636500	34.4	9.000	N	10.9	25.6	60.0



Final Result 2

Frequency (MHz)	CAverage (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.150000	30.0	9.000	N	9.7	26.0	56.0
0.159000	28.3	9.000	N	9.7	27.2	55.5
0.168000	28.3	9.000	N	9.7	26.8	55.1
0.199500	36.5	9.000	N	9.7	17.1	53.6
0.217500	31.6	9.000	N	9.7	21.3	52.9
0.240000	33.4	9.000	N	9.7	18.7	52.1
3.960500	30.3	9.000	N	10.1	15.7	46.0
4.032500	30.6	9.000	N	10.1	15.4	46.0
4.100000	31.2	9.000	N	10.1	14.8	46.0
4.172000	31.5	9.000	N	10.1	14.5	46.0
4.316000	31.6	9.000	N	10.1	14.4	46.0
4.739000	30.9	9.000	N	10.1	15.1	46.0
16.403000	26.7	9.000	N	10.7	23.3	50.0
17.397500	25.7	9.000	N	10.7	24.3	50.0
17.892500	23.9	9.000	N	10.7	26.1	50.0
18.954500	26.9	9.000	N	10.8	23.1	50.0
19.872500	22.1	9.000	N	10.8	27.9	50.0
21.425000	27.6	9.000	N	10.9	22.4	50.0



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:	: RBW 120 kHz, VBW 300 kHz
Operation Mode	: Data Communication mode
Temperature	: 23.5°C
Relative Humidity	: 47.4 %
Test Date	: May 29, 2014

Frequency (MHz)	Reading (dBuV)	Polarity (H/V)	Antenna Height (m)	Correction Factor		Limit (dBuV/m)	Total Level (dBuV/m)	Margin (dB)
				Antenna (dB/m)	Cable (dB)			
62.4	12.2	V	1.0	11.5	3.6	40.0	27.3	12.7
111.6	19.3	H	2.9	10.7	3.8	43.5	33.8	9.7
266.5	15.5	V	1.8	12.3	4.4	46.0	32.2	13.8
624.9	12.6	V	1.0	20.0	5.4	46.0	38.0	8.0

※ Calculation Formula:

1. Polarity H = Horizontal, Polarity V = Vertical
2. Reading (Receiver Reading) = Total Level – Correction Factor
3. Margin = Limit - Total Level
4. Total Level = Quasi-Peak



-For Measurement Above 1 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)

Highest Operating Frequency : 2.26 GHz
※ This product was tested up to the 5th harmonic above frequency.

Operation Mode : Data Communication mode

Temperature : 23.5°C

Relative Humidity : 47.4 %

Test Date : May 29, 2014

Frequency (GHz)	Polarity (H/V)	Antenna Height (m)	Peak			Average		
			Total Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Total Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
1.3285	V	1.4	24.9	74	49.1	31.2	54	22.8
1.9942	V	1.0	16.6	74	57.4	38.9	54	15.1
2.6647	V	1.0	24.8	74	49.2	32.7	54	21.3

※ Calculation Formula:

1. Polarity H = Horizontal, Polarity V = Vertical
2. Margin = Limit - Total Level



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>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	01.24. 2014
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	04.07. 2014
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	01.29. 2014
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100033	1 year	06.23. 2013
<input type="checkbox"/> LISN	Rohde & Schwarz	ESH3-Z5	100282	1 year	07.03. 2013
<input type="checkbox"/> Attenuator	Rohde & Schwarz	ESH3-Z2	357.8810.352	1 year	07.03. 2013
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	12.17. 2012
<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	07.01. 2013
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	04.16. 2013
<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	-
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-
-For measurement above 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	04.07. 2014
<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	21691	1 year	07.24. 2013
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	12.13. 2012
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	07.01. 2013
<input type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170124	2 year	10.30. 2013
<input type="checkbox"/> Power Amplifier	CERNEX	CBL18265035	22966	1 year	07.24. 2013
<input type="checkbox"/> Power Amplifier	CERNEX	CBL26405040	19660	1 year	04.04. 2014
<input checked="" type="checkbox"/> Software	Rohde & Schwarz	EMC32	-	-	-



6. CONCLUSION

The data collected shows that the **EUT type: Cellular/PCS GSM, Cellular WCDMA, LTE Phone with Bluetooth/WLAN/NFC, FCC ID: ZNFLGL24, Model: LGL24** complies with §15.107 and §15.109 of the FCC rules.