

EMI CERTIFICATION REPORT

Applicant:

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

Date of Issue: August 02, 2013

Test Report No.: HCTE1307FE16-3

Test Site: HCT CO., LTD.

HCT FRN: 0005-8664-21

FCC ID:

ZNFD820

Rule Part(s) / Standard(s) : FCC PART 15 Subpart B Class B
Equipment Type : GSM/CDMA/WCDMA/LTE Phone + Bluetooth & WLAN
(2.4GHz & 5GHz) and NFC
Model Name : LGD820
Additional Model Name : D820, LG-D820
Port / Connector(s) : USB Port / Headset Port
Date of Test : July 08, 2013 - July 12, 2013

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
HCTE1307FE16	July 15, 2013	Initial Release
HCTE1307FE16-1	July 16, 2013	Delete IC rule
HCTE1307FE16-2	August 01, 2013	Change Gateway Model name.
HCTE1307FE16-3	August 02, 2013	Modify Gateway FCC ID (Page .5)

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ATTACHMENT: TEST SETUP PHOTOGRAPHS

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test is **EUT type: GSM/CDMA/WCDMA/LTE Phone + Bluetooth & WLAN (2.4GHz & 5GHz) and NFC, Model Name: LGD820** manufactured by **LG Electronics MobileComm U.S.A., Inc.** Its basic purpose is used for communications.

Model Name	LGD820
Additional Model Name	D820, LG-D820
FCC ID	ZNFD820
E.U.T Type	GSM/CDMA/WCDMA/LTE Phone + Bluetooth & WLAN (2.4GHz & 5GHz) and NFC
TX Frequency	824.70 MHz to 848.31 MHz (CDMA BC0) 1 851.25 MHz to 1 908.75 MHz (CDMA BC1) 817.90 MHz to 823.10 MHz (CDMA BC10) 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) 1712.4 MHz to 1752.6 MHz (AWS WCDMA 1 700) 1 850 MHz to 1 910 MHz (LTE B2) 1 710 MHz to 1 755 MHz (LTE B4) 824 MHz to 849 MHz (LTE B5) 704 MHz to 716 MHz (LTE B17) 1 850 MHz to 1 915 MHz (LTE B25) 814 MHz to 849 MHz (LTE B26) 2 496 MHz to 2 690 MHz (LTE B41)
RX Frequency	869.70 MHz to 893.31 MHz (CDMA BC0) 1 931.25 MHz to 1 988.75 MHz (CDMA BC1) 862.00 MHz to 894.00 MHz (CDMA BC10) 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) 2 112.4 MHz to 2 152.6 MHz (AWS WCDMA 1 700) 1 930 MHz to 1 990 MHz (LTE B2) 2 110 MHz to 2 155 MHz (LTE B4) 869 MHz to 894 MHz (LTE B5) 734 MHz to 746 MHz (LTE B17) 1 930 MHz to 1 955 MHz (LTE B25) 859 MHz to 894 MHz (LTE B26) 2 496 MHz to 2 690 MHz (LTE B41)

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	Manufacturer	Model Name	FCC ID / DoC	Connected To
E.U.T	LG	LGD820	ZNFD820	Notebook PC Headset
USB cable	BROAD	EAD62330102	-	E.U.T Notebook PC
Headset	I-SOUND	EAB62729001	-	E.U.T
Notebook PC	H.P	ProBook 6560b	DoC	E.U.T Notebook PC adaptor
Notebook PC adaptor	DELTA Electronics (JIANGSU)LTD	PPP009D	-	Notebook PC
Gateway	Axesstel	MV440	PH7MV440	Notebook PC, Adaptor
Mouse	Radio shack	Serial mouse	DoC	Notebook PC
Adaptor	Yang Ming Industrial	DA-60M12	-	Gateway
RJ45 cable	-	-	-	Notebook PC, Gateway

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	Y	(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 E.U.T 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.

Measurement Facilities	Reg. No.
Radiated Field strength measurement facility (3m)	90661(Mar. 02, 2011)
Radiated Field strength measurement facility (10m)	90661 (Sep. 03, 2010)

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. SYSTEM TEST CONFIGURATION

2.1 Configuration of Test System

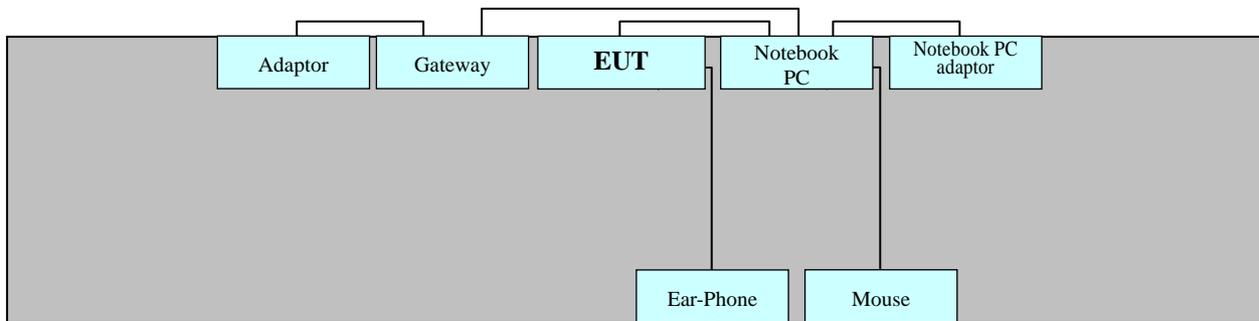
2.1.1 Conducted Emission Test

EUT was connected to LISN via Notebook PC adaptor and Base Station. Preliminary Power Line Conducted Emission tests were performed by using the procedure in ANSI C63.4/2003 7.2.3 to determine the worst operating conditions.

2.1.2 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. Final Radiated Emission tests were performed at 10 m semi-anechoic chamber.

[Configuration of Tested System]



Non-Conductive Table
Power Line: 120 VAC

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	: 23.1 °C
Humidity Level	: 59.1 %
Test Date	: July 08, 2013

Frequency (MHz)	Transd (dB)	Conductor	Quasi-Peak			Average		
			Limit	Measurement Level	Result Level	Limit	Measurement Level	Result Level
			(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dBuV)
0.202	10.0	N	64	43.9	53.9	54	28.7	38.7
0.210	9.8	H	63	46.2	56.0	53	-	-
0.214	10.0	N	63	41.6	51.6	53	21.6	31.6
0.262	10.0	N	61	37.1	47.1	51	-	-
0.270	9.8	H	61	39.0	48.8	51	21.1	30.9
0.282	9.8	H	61	37.7	47.5	51	17.6	27.4

※ **NOTE:** Refer to page 11 to page 14 for details.

1. Line H = Hot, Line N = Neutral
2. Transd = LISN factor + Cable Loss factor

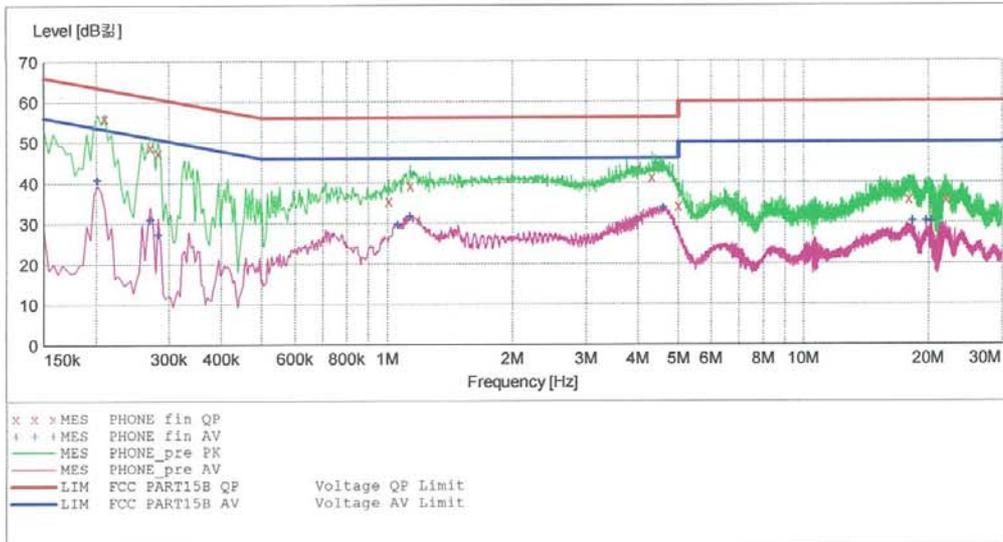
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EUT: LGD820
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART15 B
 Comment: H

SCAN TABLE: "FCC CLASS B(H)"

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	KN22 CLASS B	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			
			MaxPeak			
			Average			



MEASUREMENT RESULT: "PHONE_fin_QP"

2013-07-08 7:27오 후

Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Line	PE
0.210001	56.00	9.8	63	7.3	---	---
0.270001	48.80	9.8	61	12.3	---	---
0.282001	47.50	9.8	61	13.3	---	---
1.008000	35.50	9.8	56	20.5	---	---
1.136000	39.30	9.9	56	16.7	---	---
4.332000	41.40	10.1	56	14.6	---	---
5.000000	34.20	10.2	56	21.8	---	---
17.892000	36.00	10.9	60	24.0	---	---
22.016000	36.00	11.0	60	24.0	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-07-08 7:27 오후

Frequency MHz	Level dB _{μV}	Transd dB	Limit dB _{μV}	Margin dB	Line	PE
0.202001	40.80	9.8	54	12.7	---	---
0.270001	30.90	9.8	51	20.2	---	---
0.282001	27.40	9.8	51	23.3	---	---
1.060000	29.70	9.8	46	16.3	---	---
1.136000	31.80	9.9	46	14.2	---	---
4.592000	33.80	10.2	46	12.2	---	---
18.244000	30.50	10.9	50	19.5	---	---
19.708000	30.50	10.9	50	19.5	---	---
20.260000	30.30	10.9	50	19.7	---	---

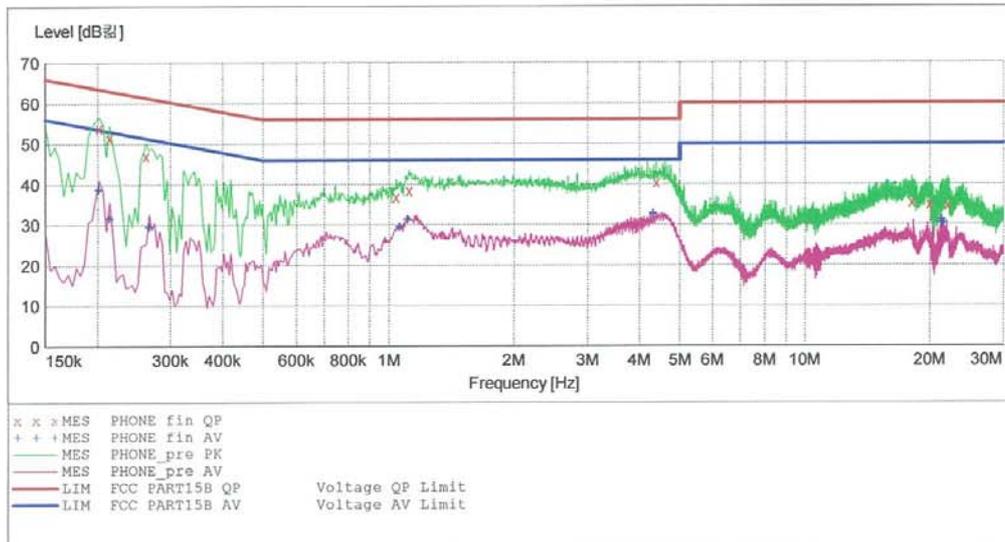
HCT

EMC

EUT: LGD820
 Manufacturer: LG
 Operating Condition: DATA MODE
 Test Site: SHIELD ROOM
 Operator: GC YOON
 Test Specification: FCC PART15 B
 Comment: N

SCAN TABLE: "FCC CLASS B(N)"

Start Frequency	Stop Frequency	Step Width	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	500.0 kHz	4.0 kHz	KN22 CLASS B	10.0 ms	9 kHz	None
500.0 kHz	5.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
5.0 MHz	30.0 MHz	4.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			



MEASUREMENT RESULT: "PHONE_fin QP"

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Frequency MHz	Level dB	Transd dB	Limit dB	Margin dB	Line	PE
0.202001	53.90	10.0	64	9.6	---	---
0.214001	51.60	10.0	63	11.4	---	---
0.262001	47.10	10.0	61	14.2	---	---
1.044000	36.90	10.1	56	19.1	---	---
1.120000	38.40	10.1	56	17.6	---	---
4.400000	40.30	10.3	56	15.7	---	---
18.036000	35.50	11.2	60	24.5	---	---
19.904000	35.00	11.2	60	25.0	---	---
22.076000	34.80	11.4	60	25.2	---	---

MEASUREMENT RESULT: "PHONE_fin AV"

2013-07-08 7:30오후

Frequency MHz	Level dB _{μV}	Transd dB	Limit dB _{μV}	Margin dB	Line	PE
0.202001	38.70	10.0	54	14.9	---	---
0.214001	31.60	10.0	53	21.4	---	---
0.266001	29.50	10.0	51	21.8	---	---
1.064000	29.60	10.1	46	16.4	---	---
1.112000	31.30	10.1	46	14.7	---	---
4.320000	32.70	10.3	46	13.3	---	---
21.224000	30.50	11.3	50	19.5	---	---
21.296000	31.20	11.3	50	18.8	---	---
21.500000	30.50	11.3	50	19.5	---	---

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: 120 kHz)

Operation Mode : Data communication mode

Temperature : 23.1 °C

Humidity Level : 59.1 %

Test Date : July 08, 2013

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)			
48.200	11.89	V	1.00	12.92	1.28	40.0	26.10	13.90
79.800	20.50	H	3.50	9.27	1.63	40.0	31.40	8.60
81.100	20.96	H	4.00	9.10	1.64	40.0	31.70	8.30
94.400	26.05	H	2.00	8.09	1.76	43.5	35.90	7.60
192.000	21.51	V	1.00	10.07	2.52	43.5	34.10	9.40
250.100	19.44	H	4.00	11.59	2.87	46.0	33.90	12.10

-For measurement above 1 GHz

Limit Apply to : FCC PART 15 Subpart B Class B

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

Temperature : 22.7 °C

Humidity Level : 44.9 %

Test Date : July 12, 2013

Frequency (GHz)	Peak			POL	Average		
	Total (dBμV/m)	Limit (dBμV/m)	Margin (dB)		Total (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1.3294	49.60	74	24.4	V	24.50	54	29.5
1.9361	53.40	74	20.6	V	37.50	54	16.5
2.0121	57.10	74	16.9	V	37.40	54	16.6
2.6561	54.00	74	20.0	V	37.70	54	16.3

※ NOTE:

1. Measurement above 1 GHz was performed from 1 GHz to the 5th harmonic of highest fundamental frequency. Test was measured by 12 GHz.

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.

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

[Radiated Emission Limits]

Frequency of Emission (MHz)	Field Strength	
	μ V/m	dB μ 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

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>					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESCI	100584	1 year	2014.04.25
<input checked="" type="checkbox"/> LISN	EMCO	3816/2SH	9706-1070	1 year	2014.04.26
<input checked="" type="checkbox"/> LISN	Rohde & Schwarz	ENV216	100073	1 year	2014.02.06
<u>Radiated Emission</u>					
-For measurement below 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	2014.07.01
<input checked="" type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9168	185	2 year	2015.04.16
<input checked="" type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input checked="" type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
<input type="checkbox"/> Trilog Antenna	Schwarzbeck	VULB9160	3301	2 year	2014.12.17
<input type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input type="checkbox"/> Turn Table	HD GmbH	2090	9702/1224	N/A	-
-For measurement above 1 GHz					
<input checked="" type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESU 26	100241	1 year	2014.07.01
<input checked="" type="checkbox"/> Antenna master	INNCO Systems	MA4000-EP	MA4000/283	N/A	-
<input checked="" type="checkbox"/> Turn Table	INNCO Systems	DT3000-3T	DT3000/69	N/A	-
<input type="checkbox"/> EMI Test Receiver	Rohde & Schwarz	ESI40	831564103	1 year	2014.04.16
<input type="checkbox"/> Antenna master	HD GmbH	MA240	240/520	N/A	-
<input type="checkbox"/> Turn Table	HD GmbH	2090	9702/1224	N/A	-
<input checked="" type="checkbox"/> Power Amplifier	Rohde & Schwarz	SCU-18	10094	1 year	2013.09.11
<input checked="" type="checkbox"/> Horn Antenna	Schwarzbeck	BBHA 9120D	296	2 year	2014.12.13

7. CONCLUSION

The data collected shows that the **E.U.T Type: GSM/CDMA/WCDMA/LTE Phone + Bluetooth & WLAN (2.4 GHz & 5 GHz) and NFC, Model: LGD820, FCC ID: ZNFD820** complies with §15.107 and §15.109 of the FCC rules.