

TEST REPORT

of

FCC CFR 47 part 1, 1.1307(b), 1.1310

FCC ID: BEJTM13LNCAHK1

Equipment Under Test : LTE Module
Model Name : TM13LNCAHK1
Applicant : LG Electronics USA
Manufacturer : LG Electronics USA
Date of Receipt : 2018.07.10
Date of Test(s) : 2018.07.17 ~ 2018.11.12
Date of Issue : 2018.12.04

In the configuration tested, the EUT complied with the standards specified above.

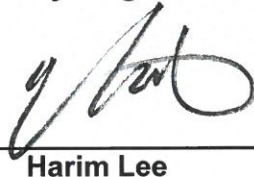
Tested By:



Jinhyoung Cho

Date:

2018.12.04

Technical
Manager:

Harim Lee

Date:

2018.12.04

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company. This test report does not assure KOLAS accreditation.

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1. General information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)

- Wireless Div. 2FL, 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

All SGS services are rendered in accordance with the applicable SGS conditions of service available on request and accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>.

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1.2. Details of applicant

Applicant : LG Electronics USA

Address : 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, United States, 07632

Contact Person : Han, Kyung-su

Phone No. : +2 201 472 2623

1.3. Details of manufacturer

Company : LG Electronics Inc.

Address : 222 LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, Korea, 17709

1.4. Description of EUT

Kind of Product	LTE Module
Model Name	TM13LNCAHK1
Power Supply	DC 4.0 V
Frequency Range	WCDMA 2: 1 850 MHz ~ 1 910 MHz, WCDMA 5: 824 MHz ~ 849 MHz, LTE Band 2: 1 850 MHz ~ 1 910 MHz, LTE Band 4: 1 710 MHz ~ 1 755 MHz, LTE Band 5: 824 MHz ~ 849 MHz, LTE Band 7: 2 500 MHz ~ 2 570 MHz, LTE Band 12: 699 MHz ~ 716 MHz, LTE Band 17: 704 MHz ~ 716 MHz
Antenna Gain	699 MHz ~ 716 MHz: 1.17 dB i, 824 MHz ~ 849 MHz: 4.16 dB i, 1 850 MHz ~ 1 910 MHz: 3.12 dB i, 1 710 MHz ~ 1 755 MHz: 2.48 dB i, 2 500 MHz ~ 2 570 MHz: 0.23 dB i

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1.5. Test report revision

Revision	Report number	Date of Issue	Description
0	F690501/RF-RTL013151	2018.11.19	Initial
1	F690501/RF-RTL013151-1	2018.12.04	Revised WCDMA Output Average Power to Antenna

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2. RF Exposure Evaluation

2.1. Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength(V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	*100	6
3.0 – 30	1842/f	4.89/f	*900/f ²	6
30 – 300	61.4	0.163	1.0	6
300 – 1 500	-	-	f/300	6
1 500 – 100 000	-	-	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3 – 1.34	614	1.63	*100	30
1.34 – 30	824/f	2.19/f	*180/f ²	30
30 – 300	27.5	0.073	0.2	30
<u>300 – 1 500</u>	-	-	<u>f/1500</u>	<u>30</u>
<u>1 500 – 100 000</u>	-	-	<u>1.0</u>	<u>30</u>

2.1.1. Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

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2.1.2. Test Result of RF Exposure Evaluation

Test Item : RF Exposure Evaluation Data
 Test Mode : Normal Operation

2.1.3. Output Power into Antenna & RF Exposure Evaluation Distance

Target values of the Maximum level of the model are set normally in conducted mode.

- LTE B2,B4,B5,B7,B12,B17 Max Power : 23.0 dBm (tolerance : +/- 2.7dBm)

Target values of the Maximum level of the model are set normally in conducted mode.

- WCDMA B5 Max power : 24 dBm (tolerance : +1.7/-3.7 dBm)
 - WCDMA B2 Max power : 24 dBm (tolerance : +1.7/-3.7 dBm)

WCDMA Band 2

- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
9262	1 852.4	25.7	3.12	0.151 611	1

WCDMA Band 5

- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
4132	826.4	25.7	4.16	0.192 633	0.550 933

LTE Band 2

- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
18607	1 850.7	25.7	3.12	0.151 611	1

LTE Band 4

- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
19957	1 710.7	25.7	2.48	0.130 837	1

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LTE Band 5
- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
20407	824.7	25.7	4.16	0.192 633	0.549 800

LTE Band 7
- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
20775	2 502.5	25.7	0.23	0.077 935	1

LTE Band 12
- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
23017	699.7	25.7	1.17	0.096 768	0.466 467

LTE Band 17
- Maximum tune up tolerance

Channel	Frequency (MHz)	Output Average Power to Antenna (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
23755	706.5	25.7	1.17	0.096 768	0.471 000

Note :

- The power density Pd (5th column) at a distance of 20 cm calculated from the friis transmission formula is far below the limit of 1 mW/cm².

- End of the Test Report -

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