

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

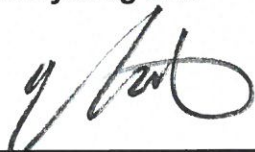
In the configuration tested, the EUT complied with the standards specified above.

Tested By:


Jinhyoung Cho

Date: 2018.12.04

Technical
Manager:


Harim Lee

Date: 2018.12.04

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SGS Korea Co., Ltd. (Gunpo Laboratory) 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807 <http://www.sgsgroup.kr>

RTT5041-19(2017.07.10)(0)

Tel. +82 31 428 5700 / Fax. +82 31 427 2370

A4(210 mm x 297 mm)

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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>.

Telephone : +82 31 688 0901

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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: $P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2)$

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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