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TEST REPORT

of

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

FCC ID: BEJTL1R22NR

Equipment Under Test	:	Telematics
Model Name	:	TL1R22NR
Variant Model Name(s)	:	Refer to the page 3
Applicant	:	LG Electronics USA
Manufacturer	:	LG Electronics Inc.
Date of Receipt	:	2022.11.04
Date of Test(s)	:	2022.11.04 ~ 2022.12.26
Date of Issue	:	2022.12.26

In the configuration tested, the EUT complied with the standards specified above. This test report does not assure KOLAS accreditation.

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Tested by: **Murphy Kim**

Technical Manager: **Jinhyoung Cho**

SGS Korea Co., Ltd. Gunpo Laboratory

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1. General Information

1.1. Testing Laboratory

SGS Korea Co., Ltd. (Gunpo Laboratory)
- 10-2, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
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- Designation number: KR0150

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1.2. Details of Applicant

Applicant	:	LG Electronics USA
Address	:	111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, United States, 07632
Contact Person	:	Kim, Sung-soo
Phone No.	:	+1 201 266 2215

1.3. Details of Manufacturer

Company	:	LG Electronics Inc.
Address	:	10, Magokjungang 10-ro, Gangseo-gu, Seoul, Korea, 07796

1.4. Description of EUT

Kind of Product	Telematics
Model Name	TL1R22NR
Variant Model Names	TL1R22NE
Serial Number	352162110229030
Power Supply	DC 12.5 V
Rated Power	GSM 850: 33 ㏈m GSM 1 900: 30 ㏈m WCDMA Ⅱ, Ⅳ, Ⅴ: 24 ㏈m LTE Band 2, 4, 5, 7, 12, 17, 26, 41: 23 ㏈m
Frequency Range	GSM 850: 824 ㎒ ~ 849 ㎒ GSM 1 900: 1 850 ㎒ ~ 1 910 ㎒ WCDMA Ⅱ: 1 850 ㎒ ~ 1 910 ㎒ WCDMA Ⅳ: 1 710 ㎒ ~ 1 755 ㎒ WCDMA Ⅴ: 824 ㎒ ~ 849 ㎒ LTE Band 2: 1 850 ㎒ ~ 1 910 ㎒ LTE Band 4: 1 710 ㎒ ~ 1 755 ㎒ LTE Band 5: 824 ㎒ ~ 849 ㎒ LTE Band 7: 2 500 ㎒ ~ 2 570 ㎒ LTE Band 12: 699 ㎒ ~ 716 ㎒ LTE Band 17: 704 ㎒ ~ 716 ㎒ LTE Band 26(Part 90): 814 ㎒ ~ 824 ㎒ LTE Band 26(Part 22): 824 ㎒ ~ 849 ㎒ LTE Band 41: 2 496 ㎒ ~ 2 690 ㎒
Modulation Technique	QPSK, 16QAM
Antenna Type	External antenna
Antenna Gain※	699 ㎒ ~ 716 ㎒: -0.2 ㏈i 704 ㎒ ~ 716 ㎒: -0.2 ㏈i 814 ㎒ ~ 824 ㎒: -0.3 ㏈i 824 ㎒ ~ 849 ㎒: -0.6 ㏈i 1 710 ㎒ ~ 1 755 ㎒: 2 ㏈i 1 850 ㎒ ~ 1 910 ㎒: 2.8 ㏈i 2 500 ㎒ ~ 2 570 ㎒: 5 ㏈i 2 496 ㎒ ~ 2 690 ㎒: 5 ㏈i
H/W Version	Rev.D
S/W Version	v001.039.026

1.5. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL003661	2022.12.26	Initial

1.6. Information of Variant Model

Model Name		Description
Basic Model	TL1R22NR	Fully mounted module on hardware.
Variant Model	TL1R22NE	Band 21 duplexer, PA are removed.

- Supported Cellular Band

MODEL	GSM	WCDMA	LTE
TL1R22NR	GSM850, PCS1900	B2, B4, B5	B2, B4, B5, B7, B12, B17, B26, B41
TL1R22NE	N/A	B2, B4, B5	B2, B4, B5, B7, B12, B17

*Difference between two models does not affect bands that can be used in the US.

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 (㎒)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (㎽/㎠)	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/f²	<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/f²)	<30
30-300	27.5	0.073	0.2	<30
300-1 500	-	-	**f/1500**	**<30**
1 500-100 000	-	-	**1.0**	**<30**

2.1.1. Friis transmission formula: Pd = (Pout*G)/(4*pi*R²)

Where Pd = power density in ㎽/㎠

Pout = output power to antenna in ㎽

G = gain of antenna in linear scale

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

Pd the limit of MPE, 1 ㎽/㎠. 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.

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

GSM 850
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Duty Cycle (%)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
824 ~ 849	33.0	2.5	35.5	-0.6	25.0	0.153 699	0.549 333

GSM 1 900
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Duty Cycle (%)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
1 850 ~ 1 910	30.0	2.5	32.5	2.8	25.0	0.168 527	1

WCDMA - Band Ⅱ
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
1 850 ~ 1 910	24.0	1.7	25.7	2.8	0.140 841	1

WCDMA Ⅳ
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
1 710 ~ 1 755	24.0	1.7	25.7	2	0.117 147	1

WCDMA - Band Ⅴ
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
824 ~ 849	24.0	1.7	25.7	-0.6	0.064 377	0.549 333

LTE Band 2
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
1 850 ~ 1 910	23.0	2.7	25.7	2.8	0.140 841	1

LTE Band 4
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
1 710 ~ 1 755	23.0	2.7	25.7	2	0.117 147	1

LTE Band 7
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 500 ~2 570	23.0	2.7	25.7	5	0.233 738	1

LTE Band 12/17
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
699 ~ 716	23.0	2.7	25.7	-0.2	0.070 588	0.466

LTE Band 26/5_Part 22
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
824 ~ 849	23.0	2.7	25.7	-0.6	0.064 377	0.549 333

LTE Band 26_Part 90
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
814 ~ 824	23.0	2.7	25.7	-0.3	0.068 981	0.542 667

LTE Band 41
- Maximum tune up tolerance

Frequency (㎒)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 ㎝ (㎽/㎠)	Limits (㎽/㎠)
2 496 ~ 2 690	23.0	2.7	25.7	5	0.233 738	1

Note;

- The power density Pd (5th column) at a distance of 20 ㎝ calculated from the friis transmission formula is far below the limit of 1 ㎽/㎠.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 ㎝ between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dBi and must not be collocated or operating in conjunction with any other antenna or transmitter unless authorized to do so by the FCC.
- According to KDB 447498 D01 RF Exposure Guidance 4.1.
- Maximum average target power is the manufacturer's declared rated power.
- Maximum average output power = Maximum average power target power (dB m) + Maximum tune up (dB).

- End of the Test Report -