

TEST REPORT

of

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

FCC ID: BEJTL1T22NR

Equipment Under Test : Telematics
Model Name : TL1T22NR
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:



Teo Kim

Technical
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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)

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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	TL1T22NR
Variant Model Name	TL1T22NE
Serial Number	352162110147030
Power Supply	DC 12.5 V
Rated Power	GSM 850: 33 dB m GSM 1 900: 30 dB m WCDMA II, IV, V: 24 dB m LTE Band 2, 4, 5, 7, 12, 17, 26, 41: 23 dB m
Frequency Range	GSM 850: 824 MHz ~ 849 MHz GSM 1 900: 1 850 MHz ~ 1 910 MHz WCDMA II: 1 850 MHz ~ 1 910 MHz WCDMA IV: 1 710 MHz ~ 1 755 MHz WCDMA V: 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 LTE Band 26(Part 90): 814 MHz ~ 824 MHz LTE Band 26(Part 22): 824 MHz ~ 849 MHz LTE Band 41: 2 496 MHz ~ 2 690 MHz
Modulation Technique	QPSK, 16QAM, GMSK, 8PSK
Antenna Type	External antenna
Antenna Gain*	699 MHz ~ 716 MHz: 2.6 dB i 704 MHz ~ 716 MHz: 2.6 dB i 814 MHz ~ 824 MHz: 2.1 dB i 824 MHz ~ 849 MHz: 2.1 dB i 1 710 MHz ~ 1 755 MHz: 5.4 dB i 1 850 MHz ~ 1 910 MHz: 6.2 dB i 2 500 MHz ~ 2 570 MHz: 6.6 dB i 2 496 MHz ~ 2 690 MHz: 6.6 dB i
H/W Version	Rev.D1
S/W Version	v004.144.010

1.5. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL003656	2022.12.26	Initial

1.6. Information of Variant Model

Model Name		Description
Basic Model	TL1T22NR	Fully mounted module on hardware.
Variant Model	TL1T22NE	Band 21 duplexer, PA are removed.

*Difference between two models does not affect bands that can be used in the US. [Band 21]

- Supported Cellular Band

MODEL	GSM	WCDMA	LTE
TL1T22NR	GSM850, PCS1900	B2, B4, B5	B2, B4, B5, B7, B12, B17, B26, B41
TL1T22NE	N/A	B2, B4, B5	B2, B4, B5, B7, B12, B17

*Operating bands are different by Software.

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/cm^2

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

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

P_d the limit of MPE, $1 mW/cm^2$. 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 (MHz)	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 cm (mW/cm ²)	Limits (mW/cm ²)
824 ~ 849	33	2.5	35.5	2.1	25	0.286 240	0.549 333

GSM 1 900

- Maximum tune up tolerance

Frequency (MHz)	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 cm (mW/cm ²)	Limits (mW/cm ²)
1 850 ~ 1 910	30	2.5	32.5	6.2	25	0.368 748	1

WCDMA II

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
1 850 ~ 1 910	23	2.7	25.7	6.2	0.308 127	1

WCDMA IV

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
1 710 ~ 1 755	23	2.7	25.7	5.4	0.256 289	1

WCDMA V

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
824 ~ 849	23	2.7	25.7	2.1	0.119 875	0.549 333

LTE Band 2

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
1 850 ~ 1 910	24	1.7	25.7	6.2	0.308 127	1

LTE Band 4

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
1 710 ~ 1 755	24	1.7	25.7	5.4	0.256 289	1

LTE Band 7

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
2 500 ~2 570	24	1.7	25.7	6.6	0.337 855	1

LTE Band 12/17

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
699 ~ 716	24	1.7	25.7	2.6	0.134 502	0.466

LTE Band 26/5_Part 22

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
824 ~ 849	24	1.7	25.7	2.1	0.119 875	0.549 333

LTE Band 26/5_Part 90

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
814 ~ 824	24	1.7	25.7	2.1	0.119 875	0.542 667

LTE Band 41

- Maximum tune up tolerance

Frequency (MHz)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Output Power (dB m)	Antenna Gain (dB i)	Power Density at 20 cm (mW/cm ²)	Limits (mW/cm ²)
2 496 ~ 2 690	24	1.7	25.7	6.6	0.337 855	1

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.
- This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
- This equipment should be installed and operated with minimum 20 cm between the radiator and your body.
- The antenna gain of this transmitter is less than 6 dB i 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 -