

TEST REPORT

of

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

FCC ID: BEJ-TM04ANNABM0

Equipment Under Test : Telematics Module
Model Name : TM04ANNABM0
Variant Model Name(s) : -
Applicant : LG Electronics USA, Inc.
Manufacturer : LG Electronics Inc.
Date of Receipt : 2024.06.25
Date of Test(s) : 2024.08.25 ~ 2024.08.29
Date of Issue : 2024.09.10

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

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- 2) The SGS Korea is not responsible for the sampling, the results of this test report apply to the sample as received.
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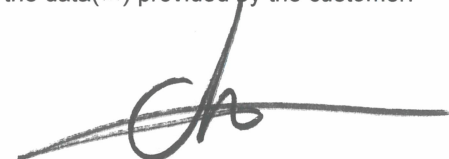
We are responsible for all the information of this test report except for the data(*) provided by the customer.

Tested by:



Hahyun Sung

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
- 4, LS-ro 182beon-gil, Gunpo-si, Gyeonggi-do, Korea, 15807
- Designation number: KR0150

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Phone No. : +82 31 688 0901

Fax No. : +82 31 688 0921

1.2. Details of Applicant

Applicant : LG Electronics USA, Inc.

Address : 111 Sylvan Avenue, North Building, Englewood Cliffs, New Jersey, United States, 07632

Contact Person : Kim, David

Phone No. : +1 201 470 2696

1.3. Details of Manufacturer

Company : LG Electronics Inc.

Address : 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea, 07336

1.4. Description of EUT

Kind of Product	Telematics Module	
Model Name	TM04ANNABM0	
Model Serial Number	001, 002	
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, 13, 17, 25, 26, 41, 66, 71: 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 13: 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1 850 MHz ~ 1 915 MHz LTE Band 26: 814 MHz ~ 824 MHz (FCC Only) LTE Band 26: 824 MHz ~ 849 MHz LTE Band 41: 2 496 MHz ~ 2 690 MHz LTE Band 66: 1 710 MHz ~ 1 780 MHz LTE Band 71: 663 MHz ~ 698 MHz
Modulation Technique	QPSK, 16QAM, GMSK, 8PSK	
Antenna Type	Shark antenna	
Antenna Gain*	Refer to the clause 1.7	
H/W Version	Rev.C3	
S/W Version	WN22XA28	

1.5. Summary of Test Results

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 1		
Section	Test Item(s)	Result
1.1307(b)(3)	RF Exposure Evaluation	Complied

1.6. Test Report Revision

Revision	Report Number	Date of Issue	Description
0	F690501-RF-RTL005430	2024.09.10	Initial

1.7. Antenna Information

Band	Operating Frequency (MHz)	Antenna Peak Gain (dB i)						
		Original [9825131_02]	Additional [920-747-018]			Additional [920-783-008]		
			Gain	Cable Loss	Final Gain	Gain	Cable Loss	Final Gain
LTE 7	2 500 ~ 2 570	2.70	7.20	5.40	1.80	3.80	5.40	-1.60
LTE 12/17	699 ~ 716	-2.10	2.70	2.90	-0.20	0.80	2.90	-2.10
LTE 13	777 ~ 787	-0.10	2.80	3.00	-0.20	1.90	3.00	-1.10
LTE 25/2	1 850 ~ 1 915	2.10	6.00	4.70	1.30	5.40	4.70	0.70
GSM 1900 WCDMA II	1 850 ~ 1 910	2.00	6.00	4.70	1.30	5.40	4.70	0.70
WCDMA V GSM 850 LTE 26/5	824 ~ 849	-1.90	1.90	3.06	-1.16	3.30	3.06	0.24
LTE 26	814 ~ 824	-1.10	1.90	3.06	-1.16	3.30	3.06	0.24
LTE 41	2 490 ~ 2 690	2.70	7.30	5.40	1.90	3.80	5.40	-1.60
LTE 66/4 WCDMA IV	1 710 ~ 1 780	2.60	2.60	4.18	-1.58	3.40	4.18	-0.78
LTE 71	663 ~ 698	-4.20	2.40	2.89	-0.49	0.90	2.89	-1.99

2. RF Exposure Evaluation

Test exemptions apply for devices used in general population/uncontrolled exposure environments, according to the SAR-based, or MPE-based exemption thresholds.

2.1. Blanket 1 mW Blanket Exemption

The 1 mW Blanket Exemption of § 1.1307(b)(3)(i)(A) applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power of no more than 1 mW, regardless of separation distance.

The 1 mW blanket exemption applies at separation distances less than 0.5 cm, including where there is no separation. This exemption shall not be used in conjunction with other exemption criteria other than those for multiple RF sources in paragraph § 1.1307(b)(3)(ii)(A).

The 1 mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it shall not be used in conjunction with other exemption criteria or in devices with higher-power transmitters operating in the same time-averaging period. Exposure from such higher-power transmitters would invalidate the underlying assumption that exposure from the lower-power transmitter is the only contributor to SAR in the relevant volume of tissue.

2.2. MPE-based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] to support an exemption from further evaluation from 300 kHz through 100 GHz.

**Table 1: THRESHOLDS FOR SINGLE RF SOURCES
 SUBJECT TO ROUTINE ENVIRONMENTAL EVALUATION**

RF Source Frequency			Minimum Distance			Threshold ERP
f_L (MHz)		f_H (MHz)	$\lambda_L / 2\pi$		$\lambda_H / 2\pi$	W
0.3	-	1.34	159 m	-	35.6 m	1 920 R ₂
1.34	-	30	35.6 m	-	1.6 m	3 450 R ₂ /f ²
30	-	300	1.6 m	-	159 mm	3.83 R ²
300	-	1 500	159 mm	-	31.8 mm	0.012 8 R ₂ f
1 500	-	100 000	31.8 mm	-	0.5 mm	19.2 R ²

Subscripts L and H are low and high; λ is wavelength.
 From § 1.1307(b)(3)(i)(C), modified by adding Minimum Distance columns.

The table applies to any RF source (i.e., single fixed, mobile, and portable transmitters) and specifies power and distance criteria for each of the five frequency ranges used for the MPE limits. These criteria apply at separation distances from any part of the radiating structure of at least $\lambda/2\pi$. The thresholds are based on the general population MPE limits with a single perfect reflection, outside of the reactive near-field, and in the main beam of the radiator.

For mobile devices that are not exempt per Table B.1 [Table 1 of § 1.1307(b)(1)(i)(C)] at distances from 20 cm to 40 cm and in 0.3 GHz to 6 GHz, evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP_{20 cm} in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B. 1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i.e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

2.3. SAR-based Exemption

SAR-based thresholds are derived based on frequency, power, and separation distance of the RF source. The formula defines the thresholds in general for either available maximum time-averaged power or maximum time-averaged ERP, whichever is greater.

If the ERP of a device is not easily determined, such as for a portable device with a small form factor, the applicant may use the available maximum time-averaged power exclusively if the device antenna or radiating structure does not exceed an electrical length of $\lambda/4$.

As for devices with antennas of length greater than $\lambda/4$ where the gain is not well defined, but always less than that of a half-wave dipole (length $\lambda/2$), the available maximum time-averaged power generated by the device may be used in place of the maximum time-averaged ERP, where that value is not known.

The separation distance is the smallest distance from any part of the antenna or radiating structure for all persons, during operation at the applicable ERP. In the case of mobile or portable devices, the separation distance is from the outer housing of the device where it is closest to the antenna.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold P_{th} (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and f is in GHz, d is the separation distance (cm), and $ERP_{20 \text{ cm}}$ is per Formula (B.1).

2.4. Simultaneous Transmission SAR Test Exemption with Respect to Multiple Exemption Criteria

Either SAR-based or MPE-based exemption may be considered for test exemption for fixed, mobile, or portable device exposure conditions; therefore, the contributions from each exemption in conjunction with the measured SAR (Evaluated_k term) shall be used to determine exemption for simultaneous transmission according to Formula (C.1) [repeated from § 1.1307(b)(3)(ii)(B)].

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

3. Test Result

3.1. SAR-based Exemption

*920-747-018

GSM Band	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Duty Cycle (%)	Maximum Average Power		Antenna Gain (dB i)	Cable Loss (dB)	ERP (mW)		Limits P _{th} (mW)	Ratio ¹⁾	Result
						(dB m)	(mW)			(dB m)	(mW)			
850	824 ~ 849	20	33.00	2.50	25.00	29.48	887.16	1.90	-3.06	26.17	413.94	1 680.96	0.53	PASS
1 900	1 850 ~ 1 910	20	30.00	1.00	25.00	24.98	314.77	6.00	-4.70	24.13	258.79	3 060.00	0.10	PASS

WCDMA Band	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Power		Antenna Gain (dB i)	Cable Loss (dB)	ERP (mW)		Limits P _{th} (mW)	Ratio ¹⁾	Result
					(dB m)	(mW)			(dB m)	(mW)			
II	1 850 ~ 1 910	20	24.00	1.70	25.70	371.54	6.00	-4.70	24.85	305.49	3 060.00	0.12	PASS
IV	1 710 ~ 1 755	20	24.00	1.70	25.70	371.54	2.60	-4.18	21.97	157.40	3 060.00	0.12	PASS
V	824 ~ 849	20	24.00	1.70	25.70	371.54	1.90	-3.06	22.39	173.38	1 680.96	0.22	PASS

LTE Band	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Power		Antenna Gain (dB i)	Cable Loss (dB)	ERP (mW)		Limits P _{th} (mW)	Ratio ¹⁾	Result
					(dB m)	(mW)			(dB m)	(mW)			
B7	2 500 ~ 2 570	20	23.00	2.70	25.70	371.54	7.20	-5.40	25.35	342.77	3 060.00	0.12	PASS
B12/17	699 ~ 716	20	23.00	2.70	25.70	371.54	2.70	-2.90	23.35	216.27	1 425.96	0.26	PASS
B13	777 ~ 787	20	23.00	2.70	25.70	371.54	2.80	-3.00	23.35	216.27	1 585.08	0.23	PASS
B25/2	1 850 ~ 1 915	20	23.00	2.70	25.70	371.54	6.00	-4.70	24.85	305.49	3 060.00	0.12	PASS
B26	814 ~ 824	20	23.00	2.70	25.70	371.54	1.90	-3.06	22.39	173.38	1 660.56	0.22	PASS
B26/5	824 ~ 849	20	23.00	2.70	25.70	371.54	1.90	-3.06	22.39	173.38	1 680.96	0.22	PASS
41	2 496 ~ 2 690	20	23.00	2.70	25.70	371.54	7.30	-5.40	25.45	350.75	3 060.00	0.12	PASS
66/4	1 710 ~ 1 780	20	23.00	2.70	25.70	371.54	2.60	-4.18	21.97	157.40	3 060.00	0.12	PASS
71	663 ~ 698	20	23.00	2.70	25.70	371.54	2.40	-2.89	23.06	202.30	1 352.52	0.27	PASS

***920-783-008**

GSM Band	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Duty Cycle (%)	Maximum Average Power		Antenna Gain (dB i)	Cable Loss (dB)	ERP (mW)		Limits P _{th} (mW)	Ratio ¹⁾	Result
						(dB m)	(mW)			(dB m)	(mW)			
850	824 ~ 849	20	33.00	2.50	25.00	29.48	887.16	3.30	-3.06	27.57	571.48	1 680.96	0.53	PASS
1 900	1 850 ~ 1 910	20	30.00	1.00	25.00	24.98	314.77	5.40	-4.70	23.53	225.42	3 060.00	0.10	PASS

WCDMA Band	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Power		Antenna Gain (dB i)	Cable Loss (dB)	ERP (mW)		Limits P _{th} (mW)	Ratio ¹⁾	Result
					(dB m)	(mW)			(dB m)	(mW)			
II	1 850 ~ 1 910	20	24.00	1.70	25.70	371.54	5.40	-4.70	24.25	266.07	3 060.00	0.12	PASS
IV	1 710 ~ 1 755	20	24.00	1.70	25.70	371.54	3.40	-4.18	22.77	189.23	3 060.00	0.12	PASS
V	824 ~ 849	20	24.00	1.70	25.70	371.54	3.30	-3.06	23.79	239.33	1 680.96	0.22	PASS

LTE Band	Frequency Range (MHz)	Minimum Separation Distance (cm)	Maximum Average Target Power (dB m)	Maximum Tune up (dB)	Maximum Average Power		Antenna Gain (dB i)	Cable Loss (dB)	ERP (mW)		Limits P _{th} (mW)	Ratio ¹⁾	Result
					(dB m)	(mW)			(dB m)	(mW)			
B7	2 500 ~ 2 570	20	23.00	2.70	25.70	371.54	3.80	-5.40	21.95	156.68	3 060.00	0.12	PASS
B12/17	699 ~ 716	20	23.00	2.70	25.70	371.54	0.80	-2.90	21.45	139.64	1 425.96	0.26	PASS
B13	777 ~ 787	20	23.00	2.70	25.70	371.54	1.90	-3.00	22.45	175.79	1 585.08	0.23	PASS
B25/2	1 850 ~ 1 915	20	23.00	2.70	25.70	371.54	5.40	-4.70	24.25	266.07	3 060.00	0.12	PASS
B26	814 ~ 824	20	23.00	2.70	25.70	371.54	3.30	-3.06	23.79	239.33	1 660.56	0.22	PASS
B26/5	824 ~ 849	20	23.00	2.70	25.70	371.54	3.30	-3.06	23.79	239.33	1 680.96	0.22	PASS
41	2 496 ~ 2 690	20	23.00	2.70	25.70	371.54	3.80	-5.40	21.95	156.68	3 060.00	0.12	PASS
66/4	1 710 ~ 1 780	20	23.00	2.70	25.70	371.54	3.40	-4.18	22.77	189.23	3 060.00	0.12	PASS
71	663 ~ 698	20	23.00	2.70	25.70	371.54	0.90	-2.89	21.56	143.22	1 352.52	0.27	PASS

Note;

- Maximum average target power is the manufacturer's declared rated power.
- Maximum average output power = Maximum average target power (dB m) + Maximum tune up (dB).
- ERP (dB m) = Maximum average power (dB m) + Antenna gain (dB i) - 2.15 (dB)

1) A greater value between the ERP(dB m) and the Maximum average power(dB m) is applied.

Conclusion: No SAR is required.

- End of the Test Report -