



## SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/0 Aug01,2022

Report No.: SZCR230400103203

Page: 1 of 7

# RF Exposure Evaluation Report

**Application No.:** SZCR2304001032AT  
**Applicant:** Treel Mobility Solutions Private Limited  
**Address of Applicant:** S.No.6/1B,6/4,7/4, Plot No.02, Shivane Laxmi Vishnupuram Amenities Business, NDA Road, Pune-411023(MH), India  
**Manufacturer:** Treel Mobility Solutions Private Limited  
**Address of Manufacturer:** Laxmi Vishnupuram Amenities Business, S.No.6/1B,6/4,7/4, Plot No.02, NDA Road, Shivane, Pune-411023(MH), India  
**Factory:** Treel Mobility Solutions Private Limited  
**Address of Factory:** Laxmi Vishnupuram Amenities Business, S.No.6/1B,6/4,7/4, Plot No.02, NDA Road, Shivane, Pune-411023(MH), India

**Equipment Under Test (EUT):**

**EUT Name:** TPMS 433 Sensor

**Model No.:** TR0001TV020201000, TR0001TV350201000 ♣

♣ Please refer to section 4.1 of this report which indicates which model was actually tested and which were electrically identical.

**Trade Mark:**



**FCC ID:** 2BA4YT01TV020201

**Standards:** 47 CFR Part 1.1307, 47 CFR Part 1.1310, 47 CFR Part 2.1091

**Date of Receipt:** 2023-04-12

**Date of Test:** 2023-04-21 to 2023-04-26

**Date of Issue:** 2023-04-27

<b>Test Result :</b>	<b>PASS*</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu  
EMC Laboratory Manager



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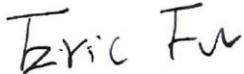
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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2023-04-27		Original

Authorized for issue by:			
			
		Edison Li/Project Engineer	
			
		Eric Fu/Reviewer	

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## 4 General Information

### 4.1 General Description of EUT

Power supply:	3V CR2050HR Battery
Nominal Frequency:	433.92MHz
Modulation Technique:	FSK
Number of Channels:	1
Antenna Type:	Metal Antenna
Antenna Gain:	0dBi

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

Model No.: TR0001TV020201000, TR0001TV350201000

Only the model TR0001TV020201000 was tested, since according to the declaration from the applicant, the electrical circuit design, layout, components used, internal wiring and functions were identical for all the above models, with only difference on model no., application and type of vehicle on which it is fitted.



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### 4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

### 4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

### 4.4 Deviation from Standards

None.

### 4.5 Abnormalities from Standard Conditions

None.

### 4.6 Other Information Requested by the Customer

None.



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## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
<b>(A) Limits for Occupational/Controlled Exposures</b>				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
<b>(B) Limits for General Population/Uncontrolled Exposure</b>				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

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

Where

$P_d$  = power density in  $\text{mW/cm}^2$

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi = 3.1416$

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

$P_d$  is the limit of MPE,  $f/1500$  or  $1 \text{ mW/cm}^2$ . 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  $r$  where the MPE limit is reached.

#### 5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.



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### 4.1.3 EUT RF Exposure Evaluation

#### For 433.92MHz:

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.00 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Antenna	Max Antenna Gain (dBi)	Max Antenna Gain (Numeric)	Max tune-up tolerance power (dBm)	Max tune-up Tolerance power to Antenna (mW)	Power Density at R = 20 cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	MPE Ratios	Result
1	0	1.00	0.003	1.0007	0.0002	0.2893	0.0007	PASS

Note: Refer to report No. SZCR230400103202 or EUT test Max Conducted Peak Output Power value.

The distancer (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement;

$$ERP = p_t \times g_t = (Exd)^2/49.2 \text{ (According to ANSI C63.10 Annex G.2).}$$

where

$p_t$  is the transmitter output power in watts

$g_t$  is the numeric gain of the transmitting antenna (dimensionless)

E is the electric field strength in V/m

d is the measurement distance in meters (m)

$$V/m = 10^{((dBuV/m) - 120) / 20}$$

- End of the Report -

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