



TESTING LABORATORY
CERTIFICATE#4323.01



FCC PART 15C TEST REPORT

For

Shanghai shengzhen commercial & trade Ltd company

Xinlong road No.1373 Room 606 Minhang Distirct, Shanghai, China

FCC ID: 2ANHJTPMS

Report Type: Original Report	Product Type: Tire Pressure Monitoring System
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Report Number: <u>RSHA181224003-00A</u>	
Report Date: <u>2019-01-08</u>	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Shanghai shengzhen commercial & trade Ltd company
Tested Model	TPMS
Product Type	Tire Pressure Monitoring System
Power Supply	DC 3.0V from battery

**All measurement and test data in this report was gathered from production sample serial number: 20181224003. (Assigned by BACL, Kunshan). The EUT was received on 2018-12-24.*

Objective

This report is prepared on behalf of *Shanghai shengzhen commercial & trade Ltd company* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205 and 15.209 rules.

Related Submittal(s)/Grant(s)

No Related Submittal(s)/Grant(s).

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19 dB
Radiated emission	9kHz~30MHz	3.19dB
	30MHz~1GHz	6.11dB
Temperature		1.0°C
Humidity		6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user)

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

No Exercise Software was used.

Support Equipment List and Details

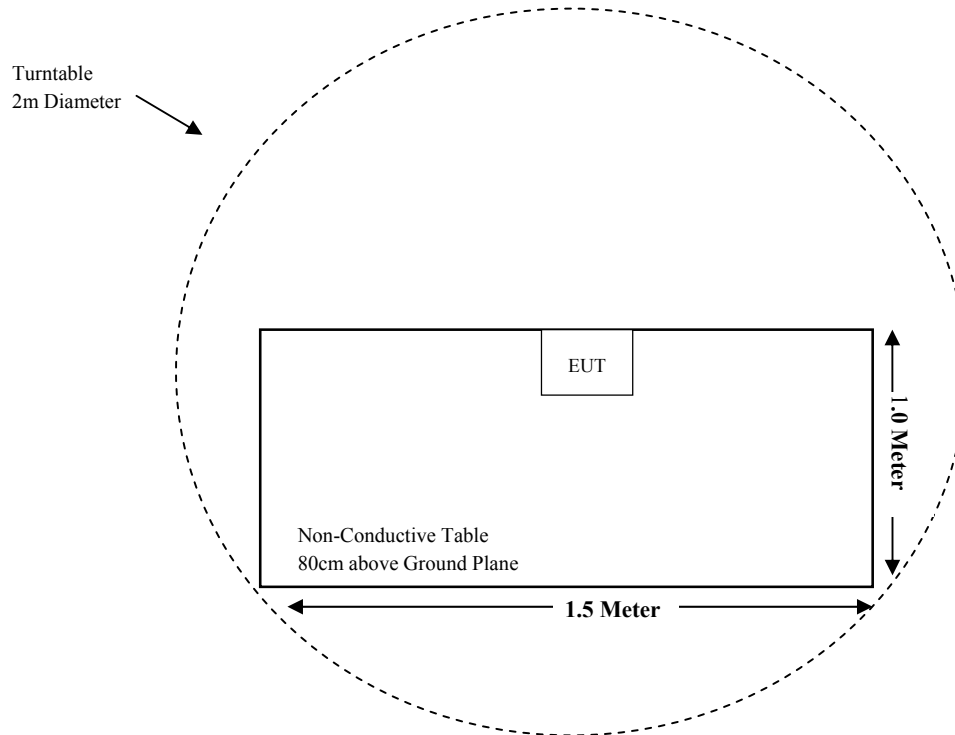
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup

For Radiated Emissions(Below 30MHz & Above 30MHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Not applicable (See Note)
§15.205, §15.209	Spurious Emissions	Compliance
§15.215 (c)	20dB Emission Bandwidth	Compliance

Note: The EUT is powered by battery.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test(Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-12	2019-11-11
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2018-08-15	2019-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2018-08-15	2019-08-14
Radiated Emission Test(Chamber 2#)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2018-08-27	2019-08-26
ETS-LINDGREN	PASSIVE LOOP	6512	108100	2016-01-09	2019-01-08
Sonoma Instrument	Pre-amplifier	310N	185700	2018-08-15	2019-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2018-08-15	2019-08-14

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

Antenna Connector Construction

The EUT has an integral antenna arrangement, which the antenna gain is 0 dBi; fulfill the requirement of this section. Please refer to the EUT photos.

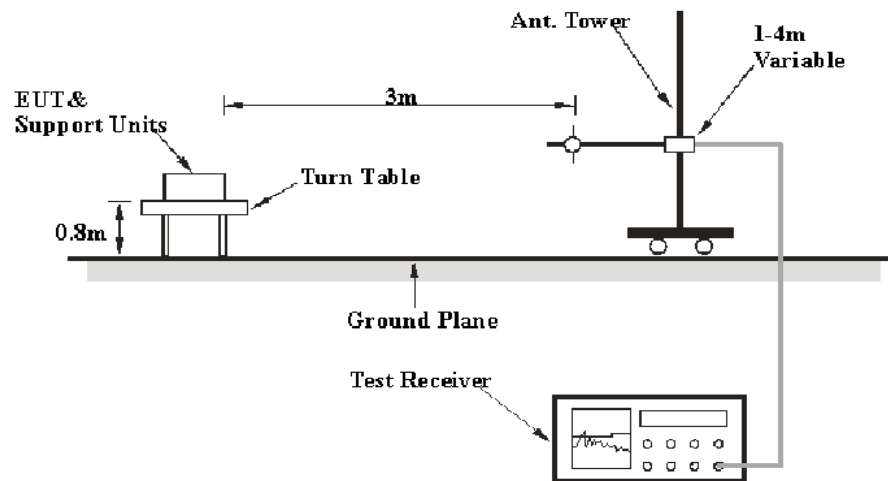
Result: Compliant

FCC §15.209 & §15.205 - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.209; §15.205;

EUT Setup



The radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and FCC 15.205 limits.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 1GHz.

During the radiated emission test, the EMI test receiver setup was set with the following configurations:

Frequency Range	RBW	Video B/W	Detector
9 kHz – 150 kHz	200 Hz	1 kHz	QP
150 kHz – 30MHz	9kHz	30kHz	QP
30 MHz – 1000 MHz	120 kHz	300 kHz	QP

Note: For the frequency bands 9-90 kHz and 110-490 kHz, the test was based on average detector.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 meter, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude (dB}\mu\text{V /m)} = \text{Meter Reading (dB}\mu\text{V)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Amplifier Gain (dB)}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V/m)} - \text{Corrected Amplitude (dB}\mu\text{V /m)}$$

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205 and 15.209.

Test Data

Environmental Conditions

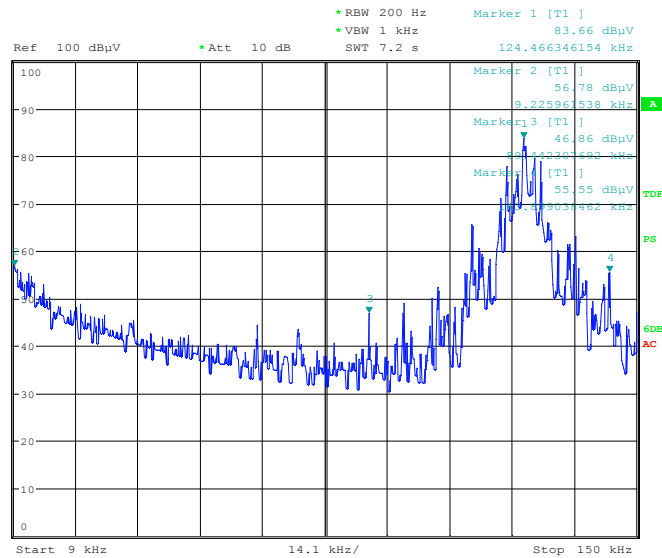
Temperature:	24.2℃
Relative Humidity:	51 %
ATM Pressure:	101.2 kPa

The testing was performed by Stone Zhang from 2018-12-30.

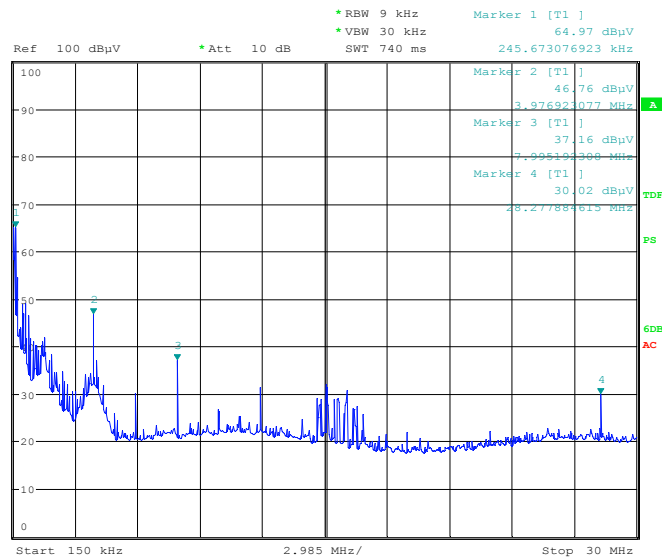
EUT operation mode: charging and communication

9 kHz-30 MHz:

(Pre-scan in the X, Y and Z axes of orientation, the worst case **in X-axis of orientation** was recorded)

9kHz-150kHz (PK)

Date: 30.DEC.2018 13:58:54

150kHz-30MHz (PK)

Date: 30.DEC.2018 18:00:05

9kHz-490kHz:

Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (kHz)	Corrected Amplitude (dBμV/m) @3m			Limit (dBμV/m) @3m	Limit (dBμV/m) @300m	Margin (dB)
9.23	56.78	PK	38.1	128.30	48.30	71.52
89.44	46.86	PK	31.2	108.57	28.57	61.71
103.54	66.12	PK	30.1	107.30	27.30	41.18
125.00	83.66	PK	28.1	105.67	25.67	22.01
143.90	55.55	PK	25.1	104.44	24.44	48.89
245.67	63.45	PK	19.8	99.79	19.79	36.34

Note: The average emissions which fall into frequencies 9-90 kHz, 110-490 kHz was not recorded, because the peak emissions are below the average limit.

490kHz-30MHz

Indicated		PK/QP/Ave.	Corrected Factor (dB/m)	FCC Part 15.209		
Frequency (MHz)	Corrected Amplitude (dBμV/m) @3m			Limit (dBμV/m) @3m	Limit (dBμV/m) @30m	Margin (dB)
3.97	46.76	PK	0.2	69.54	29.54	22.78
7.99	37.16	PK	0.6	69.54	29.54	32.38
28.28	30.02	PK	-2.1	69.54	29.54	39.52

Note:

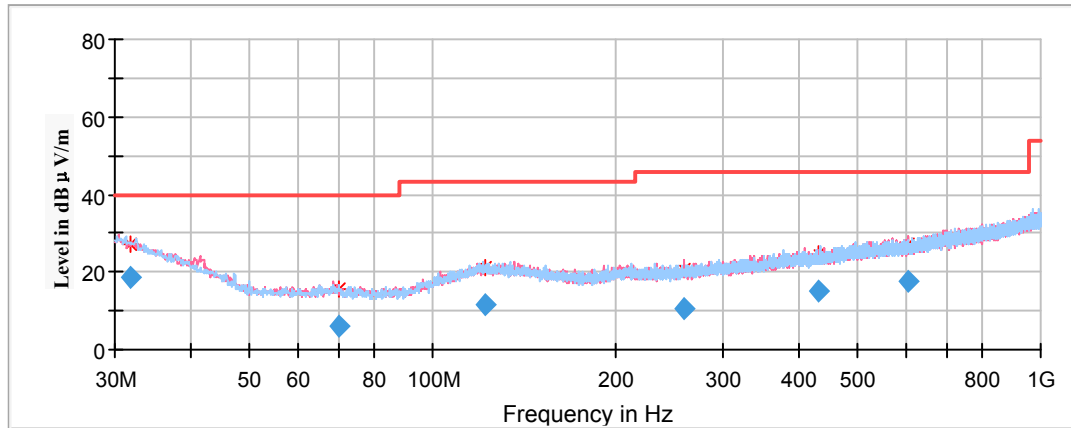
Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

30MHz-1GHz (For DC 3.0V)

(Pre-scan in the X,Y and Z axes of orientation, the worst case **in X-axis of orientation** was recorded)



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dB μ V/m)	Height (cm)	Polar (H/V)				
31.864600	18.38	101.0	H	272.0	-5.2	40.00	21.62
69.946000	6.15	199.0	V	0.0	-17.3	40.00	33.85
121.922500	11.45	199.0	H	346.0	-11.3	43.50	32.05
258.907900	10.78	101.0	V	0.0	-11.8	46.00	35.22
432.540750	14.90	101.0	H	24.0	-7.7	46.00	31.10
604.086800	17.44	101.0	V	148.0	-5.1	46.00	28.56

Note:

Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

FCC §15.215 (c) - 20dB EMISSION BANDWIDTH TESTING

Requirement

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.

Test Data

Environmental Conditions

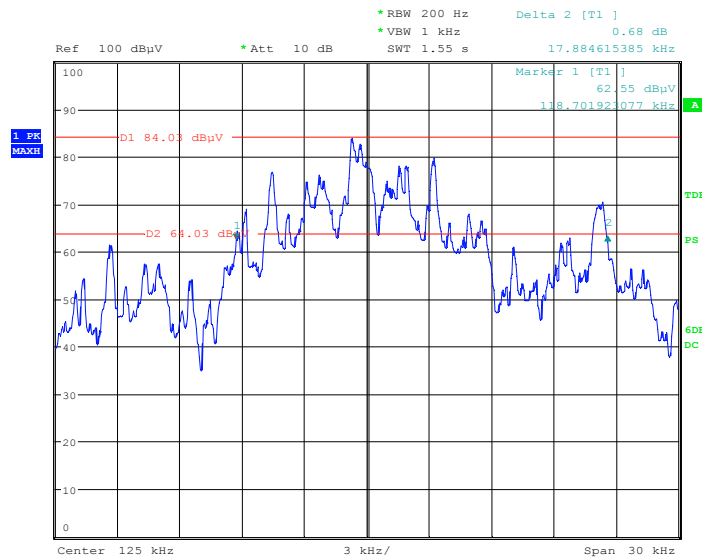
Temperature:	23.2 °C
Relative Humidity:	50 %
ATM Pressure:	101.3 kPa

The testing was performed by Stone Zhang on 2019-01-02.

Test Mode: Transmitting

Test Result: Pass

Frequency (kHz)	20 dB Bandwidth (kHz)
125	17.88

20 dB Emission Bandwidth

Date: 2.JAN.2019 15:36:04

******* END OF REPORT *******