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FCC Designation Number: CN1199

Test report No:
2170153R-RF-US-P20V01

TEST REPORT
C Rules&Requlations FCC Exposure Evaluation Declaration

Product Name	Passive Entry Passive Start
Trademark	SGMW
Model and /or type reference	PEPS ECU
FCC ID	2AVYX-PEPS-ECU-NAEN
Applicant´s name / address	SAIC GM WULING AUTOMOBILE COMPANY LIMITED No.18 Hexi Road Liuzhou City, Guangxi Zhuang Autonomous Region, 545007 China
Test method requested, standard	KDB 447498D01V06 FCC Part1.1310
Verdict Summary	IN COMPLIANCE
Documented By (name / position & signature)	Adma Lu/Project Engeneer
Approved by (name / position & signature)	Jack Zhang/ Supervisor
Date of issue	2021-12-01
Report Version	V1.0
Report template No	Template_FCC MPE-RF-V1.0

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COMPETENCES AND GUARANTEES

DEKRA is a testing laboratory competent to carry out the tests described in this report.
In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	July. 05, 2021
Date (start test)	July. 10, 2021
Date (finish test)	Sep. 27, 2021

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or Competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT : Equipment Under Test
QP : Quasi-Peak
CAV : CISPR Average
AV : Average
CDN : Coupling Decoupling Network
SAC : Semi-Anechoic Chamber
OATS : Open Area Test Site
BW : Bandwidth
AM : Amplitude Modulation
PM : Pulse Modulation
HCP : Horizontal Coupling Plane
VCP : Vertical Coupling Plane
U_N : Nominal voltage
*T*x : Transmitter
*R*x : Receiver
N/A : Not Applicable
N/M : Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2170153R-RF-US-P20V01	V1.0	Initial issue of report.	2021-12-01

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with KDB 447498 and FCC Part 1.1310
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results relate only to the samples tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.

1. General Information

1.1. EUT Description

Product Name	SAIC GM WULING AUTOMOBILE COMPANY LIMITED
Model No.	PEPS ECU
Working Voltage	DC 12V
Carrier Frequency	125KHz
Type of Modulation	ASK

1.2. Mode of Operation

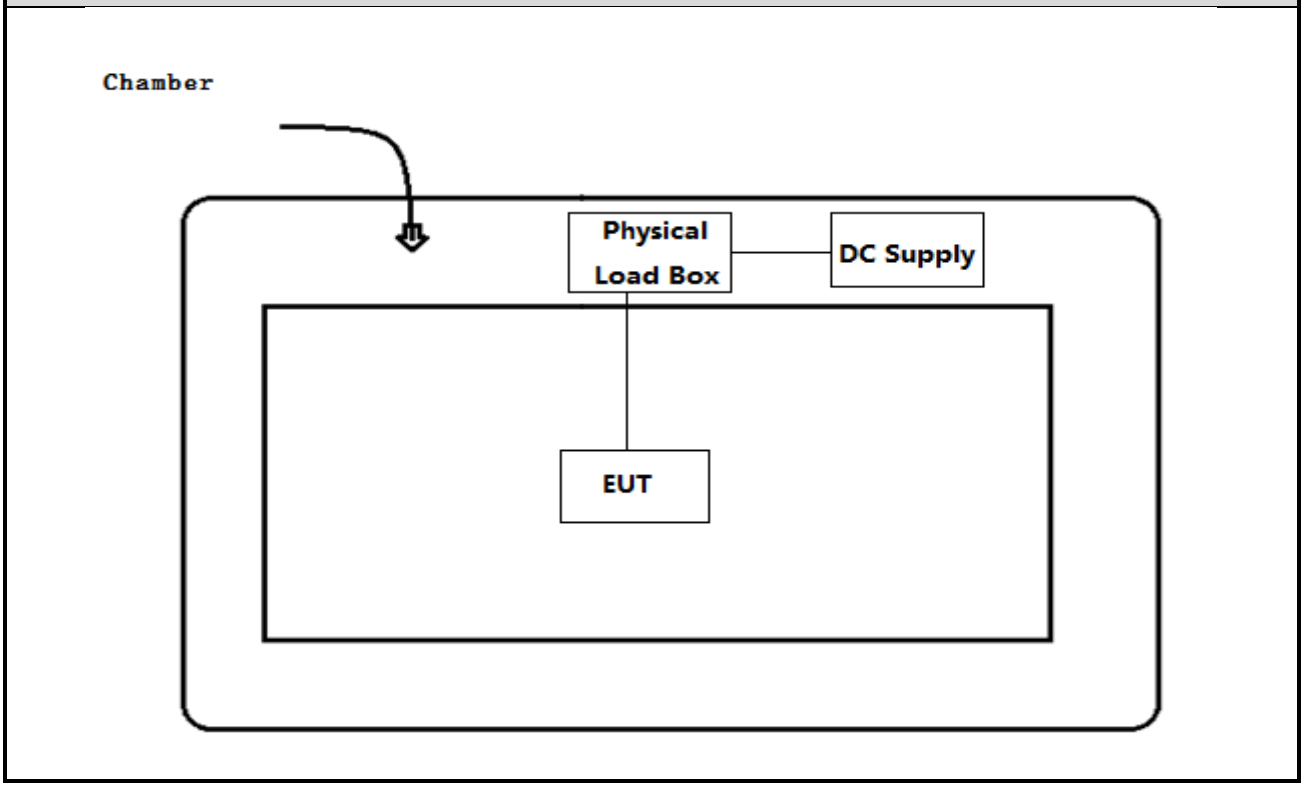
DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: Transmit

Note:

1. Regards to the frequency band operation: the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.
2. For portable device, radiated spurious emission was verified over X, Y, Z Axis, and shown the worst case on this report.

1.3. Configuration of Tested System

Connection Diagram


1.4. EUT Exercise Software

1	Setup the EUT and simulators as shown on above.
2	Turn on the physical load box and configure the signal.
3	Verify that the EUT works properly.

2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

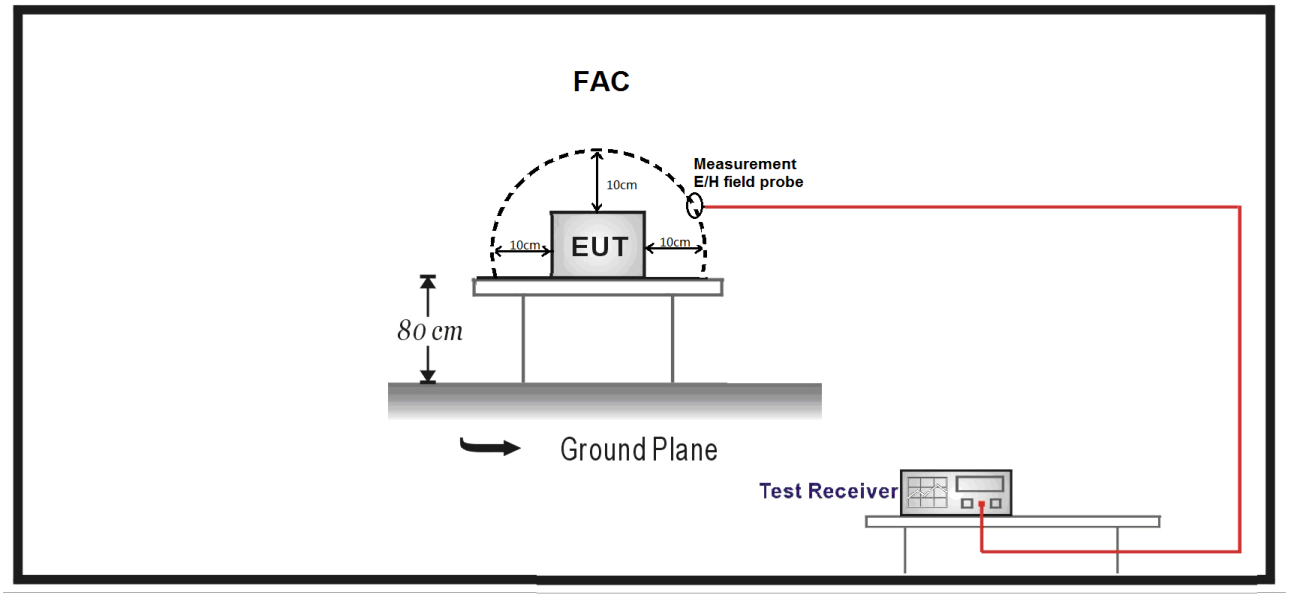
3. Electric Field Strength

3.1 Test Equipment

Electric Field Strength / AC-6					
Instrument	Manufacturer	Type No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MY48030494	2021.08.13	2022.08.12
Loop Antenna	R&S	HFH2-Z2	833799/003	2021.01.26	2022.01.25
Field Meter	WAVECONTROL	SMP2	20SN1286	2021.06.26	2022.06.25
Coaxial Cable	Huber+Suhner	SUCOFLEX 106	AC2-C	2021.04.03	2022.04.02
Temperature/Humidity Meter	RTS	RTS-8S	RF-06	2021.08.17	2022.08.16
Note: All equipment are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.					

3.2 Test Setup

3kHz~10MHz Test Setup:



3.3 Limit

According to FCC 1.1310: 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 1.1307(b)

LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
00-1500	--	--	F/300	6
1500-100000	--	--	5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S)(mW/cm^2)	Averaging Times $\|E\|^2$, $\|H\|^2$or S (inutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	F/1500	30
1500-100000	--	--	1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

Friis Formula
Friis transmission formula: Pd = (Pout*G)/(4*pi*r2)

Where
Pd = power density in mW/cm2
Pout = 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

Pd is the limit of MPE, 1 mW/cm2. 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.

3.4 Test Procedure

a. Set the measurement frequency of the measurement probe to the fundamental frequency of the device under test.
b. Set the span to encompass the entire emission bandwidth.
c. Set the RBW greater than the 99% OBW of the fundamental emission.

Note: This step is not required for a broadband measurement probe that integrates the entire frequency range.

d. Set the detector to Peak and trace display to Max-Hold.
e. Allow the spectrum to fill; for pulsing devices this may require an increased monitoring period.
f. Using a marker, set it to the maximum level of the spectral envelope.
g. Repeat steps (b) to (f) while scanning a parallel plane at the measurement distance of 10cm on each side of the device to find the peak level.
h. Repeat steps (b) to (g) for any frequencies where the field value is greater than -20 dBc below the maximum level identified.
i. If there are multiple frequencies transmitted by the device under test, use equations (2) and (3) to determine compliance.

Note: When scanning around the entire device, the location found to be the maximum for the E- or H-field may not be the same location as the opposite field.

3.5 Uncertainty

The measurement uncertainty is defined as ± 3.80 dB

3.6 Test Result

Axial	Maximum Freq. (kHz)	Maximum Level (mV/m)	Limit (V/m)	Result
X	125	98.67	307	Pass
Y	125	56.08	307	Pass
Z	125	79.19	307	Pass
Axial	Maximum Freq. (kHz)	Maximum Level (μA/m)	Limit (A/m)	Result
X	125	810	0.815	Pass
Y	125	530	0.815	Pass
Z	125	720	0.815	Pass

The End