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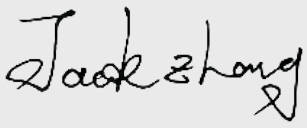
Test report No:
2450463R-RF-US-P20V01

FCC Exposure TEST REPORT

Product Name	Navistar Key Fob
Trademark	Navistar
Model and /or type reference	4060791C2
FCC ID	2AFCZ-315C2
Applicant´s name / address	Beijing Jingwei Hirain Technologies Co., Ltd 4F, Block 1, No.14 Jiuxianqiao Road,Chaoyang District, Beijing, China
Test method requested, standard	FCC 47CFR §2.1093
Verdict Summary	IN COMPLIANCE
Documented by (name / position & signature)	Tim Cao/ Project Manager 
Approved by (name / position & signature)	Jack Zhang/ Manager 
Date of issue	2024-08-07
Report Version	V2.0
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.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	May. 20, 2024
Date (start test)	May. 21, 2024
Date (finish test)	May. 24, 2024

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
2450463R-RF-US-P20V01	V1.0	Initial issue of report.	2024-07-08
2450463R-RF-US-P20V01	V2.0	Page1,6: Update applicant and manufacturer information. (The test report No.: 2450463R-RF-US-P20V01 V2.0 is to replace the test report No.: 2450463R-RF-US-P20V01 V1.0, and test report 2450463R-RF-US-P20V01 V1.0 is obsoleted.)	2024-08-07

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 FCC 47CFR §2.1093.
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, unless the specification, standard or customer have special requirements
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.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:

- Chapter 1.1 General Description of the Item(s);
- Chapter 1.2 Antenna Information;

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name.....:	Navistar Key Fob
Model No. .....:	4060791C2
FCC ID.....:	2AFCZ-315C2
Software Version .....:	V1.1
Hardware Version.....:	V1.1
Manufacturter .....:	Beijing Jingwei Hirain Technologies Co., Ltd
Manufacturer Address .....:	4F, Block 1, No.14 Jiuxianqiao Road,Chaoyang District, Beijing, China

Wireless specifiction .....:	N/A
Operating frequency range(s).....:	315MHz
Type of Modulation .....:	FSK
Number of channel .....:	1

Rated power supply .....:	Voltage and Frequency	
	☐	AC: 220 - 240 V, 50/60 Hz
	☐	AC: 100 - 240 V, 50/60 Hz
	☐	DC: 3 Vdc
	☒	Battery: 3 V
	☐	Adapter: ……
Brand of adapter .....:	N/A	
Adapter model.....:	N/A	
Mounting position.....:	☐	Table top equipment
	☐	Wall/Ceiling mounted equipment
	☐	Floor standing equipment
	☐	Hand-held equipment
	☒	Other:Vehicle-Mounted quipent

1.2 Antenna Information

Antenna Delivery .....:	☒	1TX + 1RX		
	☐	2TX + 2RX		
	☐	Others:……		
Antenna technology.....:	☒	SISO		
	☐	MIMO	☐	CDD
			☐	Beam-forming
Antenna Type .....:	☐	External	☐	Dipole
			☐	Sectorized
	☒	Internal	☐	FPC
			☒	PCB
			☐	Metal Monopole Antenna
			☐	Ceramic chip
			☐	Others……..
Antenna Gain.....:	-3.1 dBi			

2 RF EXPOSURE EVALUATION

2.1 Limits

According to § 1.1307(b)(3)(i)(A)

The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

§ 1.1307(b)(3)(ii)(A)

The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those is paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A)

Pi = 3.1416
R = distance between observation point and center of the radiator in cm

Pd is 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 r where the MPE limit is reached.

2.2 Test Procedure

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

The temperature and related humidity: 18℃and 78% RH.

2.3 Test Result of RF Exposure Evaluation

Product	:	Navistar Key Fob
Test Item	:	RF Exposure Evaluation
Test Site	:	AC-6

Power Density:
Predication of MPE limit at a given distance
Equation from page 19 of OET Bulletin 65, Edition 97-01

$$S = \frac{EIRP}{4\pi R^2}$$

where:
S = power density (in appropriate units, e.g. mW/cm^2)
EIRP = equivalent (or effective) isotropically radiated power (in appropriate units, e.g., mW)
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)
EIRP = p_t x g_t = (E x d)^2/30
where:
p_t = transmitter output power in watts,
g_t = numeric gain of the transmitting antenna (unitless),
E = electric field strength in V/m, --- $10^{((dBuV/m)/20)}/10^6$,
d = measurement distance in meters (m)--- 3m.

Field strength = 79.80 dBuV/m @3m

So EIRP = (E x d)^2/30= {[$10^{(79.80/20)}/10^6$x3]^2/30}x1000mW
= 0.03mW
= -15.23 dBm

The tune-up power is 0.5 dB, so the maximum power we used to calculate RF exposure is -14.73 dBm.

Frequency Range (MHz)	Maximum Power (dBuV/m)	EIRP (dBm)	ERP (dBm)	ERP (mW)	Limit (mW)	Verdict
315	79.80	-14.73	-16.88	0.021	1	SAR test not required

Conclusion: SAR test is not required.

The End