

Test Report

Verified code: 846288

Report No.: E202210283700-01-4

Customer: Huizhou Desay SV Automotive Co., Ltd.

Address: 103, Hechang 5th Road West, Zhongkai National Hi-tech Industrial Development Zone, Huizhou, Guangdong, P.R. China

Sample Name: Infotainment Head Unit

Sample Model: IC2592/18

Receive Sample Date: Nov.07,2022

Test Date: Nov.07,2022 ~ Dec.22,2022

Reference Document: CFR 47, FCC Part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices.

Test Result: Pass

Prepared by:

Huang Lifang

Reviewed by:

Wu Haoting

Approved by:

Xiao Liang

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2023-02-17

GUANGZHOU GRG METROLOGY & TEST CO., LTD.

Address: No.163, Pingyun Road, West of Huangpu Avenue, Guangzhou, Guangdong, China
Tel: (+86) 400-602-0999 FAX: (+86) 020-38698685 Web: <http://www.grgtest.com>



Statement

1. The report is invalid without "special seal for inspection and testing"; some copies are invalid; The report is invalid if it is altered or missing; The report is invalid without the signature of the person who prepared, reviewed and approved it.
2. The sample information is provided by the client and responsible for its authenticity; The content of the report is only valid for the samples sent this time.
3. When there are reports in both Chinese and English, the Chinese version will prevail when the language problems are inconsistent.
4. If there is any objection concerning the report, please inform us within 15 days from the date of receiving the report.
5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

———— The following blanks ————

TABLE OF CONTENTS

1. GENERAL DESCRIPTION OF EUT..... 5

1.1. APPLICANT 5

1.2. MANUFACTURER..... 5

1.3. BASIC DESCRIPTIONOF EQUIPMENTUNDER TEST 5

2. LABORATORY..... 7

3. ACCREDITATIONS 7

4. LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE 8

5. CALCULATION METHOD 9

6. ESTIMATION RESULT 10

6.1 MEASUREMENT RESULTS 10

7. CONCLUSION 11

———— The following blanks ————

REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E202210283700-01-4	Original Issue	2022-12-22

----- The following blanks -----

1. GENERAL DESCRIPTION OF EUT

1.1. APPLICANT

Name: Huizhou Desay SV Automotive Co., Ltd.
Address: 103, Hechang 5th Road West, Zhongkai National Hi-tech Industrial Development Zone, Huizhou, Guangdong, P.R. China

1.2. MANUFACTURER

Name: Huizhou Desay SV Automotive Co., Ltd.
Address: 103, Hechang 5th Road West, Zhongkai National Hi-tech Industrial Development Zone, Huizhou, Guangdong, P.R. China

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Infotainment Head Unit
Model No.: IC2592/18
Trade Name: DESAY SV
FCC ID: 2AEQTIC259218
Power Supply: DC 12V
Frequency Band: Bluetooth :
GFSK / $\pi/4$ -DQPSK/8DPSK: 2402MHz~2480MHz
2.4G wifi:
IEEE 802.11b/g/n HT20: 2412MHz-2462MHz
5G wifi-U-NII-1:
IEEE 802.11a / n HT20 / ac VHT20/ n HT40 / ac VHT40/ ac VHT80:
5180 MHz~5240 MHz
5G wifi-U-NII-3:
IEEE 802.11a / n HT20 / ac VHT20/ n HT40 / ac VHT40/ ac VHT80:
5745 MHz~5825 MHz
Maximum Transmit Power: Bluetooth :
GFSK: 9.78 dBm
 $\pi/4$ -DQPSK: 8.39dBm
8DPSK: 8.76dBm
2.4G wifi:
IEEE 802.11b/g/n HT20:
IEEE 802.11b: 20.58dBm
IEEE 802.11g: 24.58dBm
IEEE 802.11n HT20: 24.38dBm
5G wifi-U-NII-1:
11.20dBm for IEEE 802.11a
9.29dBm for IEEE 802.11n HT20
9.69dBm for IEEE 802.11ac VHT20
7.45dBm for IEEE 802.11n HT40
7.83dBm for IEEE 802.11ac VHT40
7.29dBm for IEEE 802.11ac VHT80

5G wifi-U-NII-3:
14.02dBm for IEEE 802.11a
12.29dBm for IEEE 802.11n HT20
12.73dBm for IEEE 802.11ac VHT20
10.36dBm for IEEE 802.11n HT40
10.72dBm for IEEE 802.11ac VHT40
10.29dBm for IEEE 802.11ac VHT80

Antenna Specification: Bluetooth :
PCB Antenna with 1dBi gain (Max)
2.4G wifi:
IPEX internal PCB antenna with 4.7dBi gain (Max)
5G wifi-U-NII-1:
IPEX internal PCB antenna with 3.7dBi gain (Max)
5G wifi-U-NII-3:
IPEX internal PCB antenna with 3.7dBi gain (Max)

Temperature Range: -30°C~80°C

Hardware Version: 1.0.0

Software Version: 00.01.00

Sample No: E202210283700-01-0001, E202210283700-01-0003

Note: /

———— The following blanks ————

2. LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

Add.: No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People's Republic of China.
P.C.: 518110
Tel : 0755-61180008
Fax: 0755-61180008

3. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA A2LA(Certificate #2861.01)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada ISED (Company Number: 24897, CAB identifier:CN0069)

USA FCC (Registration Number: 759402, Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site,
<http://www.grgtest.com>

———— The following blanks ————

4. LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

According to the KDB 447498 D04 Interim General RF Exposure Guidance v01, General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table 4.1 to support an exemption from further evaluation from 300 kHz through 100 GHz.

TABLE 4.1—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	$0.0128 R^2 f$
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.						

For mobile devices that are not exempt per Table 4.1 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 $ERP_{20\text{cm}}$ in Formula (4.1).

$$P_{\text{th}} (\text{mW}) = ERP_{20 \text{ cm}} (\text{mW}) = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (4.1)$$

In accordance with KDB447498D04 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

$$\text{MPE Ratio} = \sum_{j=1}^b \frac{ERP_j}{ERP_{\text{th},j}} < 1$$

ERP_j : the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j .

$ERP_{\text{th},j}$: exemption threshold ERP for fixed, mobile, or portable RF source j , at a distance of at least $\lambda/2\pi$, according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.

the sum of the ratios of the applicable terms for SAR-based, MPE-based and measured SAR or MPE shall be less than 1, to determine simultaneous transmission exposure compliance

5. CALCULATION METHOD

Predication of MPE limit at a given distance

$EIRP(dBm) = \text{Maximum Tune-up Output power (dBm)} + \text{Maximum antenna gain (dBi)}$

$ERP(dBm) = EIRP(dBm) - 2.15$

R= minimum distance to the center of radiation of the antenna

From the EUT RF output power, the minimum mobile separation distance, $d=20\text{cm}$, as well as the maximum gain of the used as following information, the RF power ERP can be obtained.

Table 1 Antenna Specification

Frequency Band	Antenna type	Internal Identification	Maximum antenna gain
Bluetooth	PCB antenna	Antenna 1	1.0dBi
2.4G wifi	IPEX internal PCB antenna	Antenna 2	4.7dBi
5G wifi-U-NII-1	IPEX internal PCB antenna	Antenna 2	3.7dBi
5G wifi-U-NII-3	IPEX internal PCB antenna	Antenna 2	3.7dBi

Table 2 Transmit Power

Frequency Band	Maximum Output Power (dBm)	Max.Tune-up Output Power (dBm)
Bluetooth	9.78	10.00+1
2.4G wifi	24.58	25.00+1
5G wifi-U-NII-1	11.2	11.50+1
5G wifi-U-NII-3	14.02	14.50+1

Note:

1. The maximum output Power of Bluetooth is refer to the module report. (Report No.: E202210283700-01-1).
2. The maximum output Power of 2.4G wifi is refer to the module report. (Report No.: E202210283700-01-2).
3. The maximum output Power of 5G wifi-U-NII-1&5G wifi-U-NII-3 are refer to the module report. (Report No.: E202210283700-01-3).

6. ESTIMATION RESULT

6.1 MEASUREMENT RESULTS

STANDALONE MPE

Mode	Frequency (MHz)	Maximum Tune-up Output power (dBm)	Antenna Gain (dBi)	Maximum Tune-up EIRP (dBm)	Maximum Tune-up ERP (dBm)	Maximum Tune-up ERP (W)	Threshold ERP (W)
Bluetooth	2402 - 2480	11.00	1.0	12.00	9.85	0.0097	0.7680
2.4G wifi	2412 - 2462	26.00	4.7	30.70	28.55	0.7161	0.7680
5G wifi-U-NII-1	5180 - 5240	12.50	3.7	16.20	14.05	0.0254	0.7680
5G wifi-U-NII-3	5745 - 5825	15.50	3.7	19.20	17.05	0.0507	0.7680

Remark:

1. RF Exposure use distance is 20cm from manufacturer declaration of user manual.
2. $ERP = EIRP - 2.15$
3. $Threshold\ ERP(W) = 19.2R^2(W) = 19.2 * 0.2 * 0.2(W) = 0.7680(W)$.

For Simultaneous transmission:

- $\sum MPE\ ratios = MPE\ ratio(2.4G\ wifi) + MPE\ ratio(Bluetooth);$
 $\sum MPE\ ratios = MPE\ ratio(5G\ wifi-U-NII-1) + MPE\ ratio(Bluetooth);$
 $\sum MPE\ ratios = MPE\ ratio(5G\ wifi-U-NII-3) + MPE\ ratio(Bluetooth);$

Maximum Simultaneous transmission MPE Ratio for WLAN(2.4G wifi) and Bluetooth

Maximum MPE ratio (2.4G wifi)	Maximum MPE ratio (Bluetooth)	$\sum MPE\ ratios$	Limit	Results
0.9324	0.0126	0.9450	1.00000	Pass

Note:

1. The bluetooth and wifi support simultaneous.
2. ERP_j : the available maximum time-averaged power or the ERP, whichever is greater, of fixed, mobile, or portable RF source j.
3. $ERP_{th,j}$: exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$, according to the applicable § 1.1307(b)(3)(i)(C) Table 1 formula at the location in question.
4. Maximum MPE Ratio (2.4G wifi) = Maximum Tune-up ERP = $0.7161W/0.7680W = 0.9324$;
 Maximum MPE Ratio (Bluetooth) = Maximum Tune-up ERP = $0.0097W/0.7680W = 0.0126$;
 $\sum MPE\ ratios = Maximum\ MPE\ Ratio\ (2.4G\ wifi) + Maximum\ MPE\ Ratio\ (Bluetooth)$
 $= 0.9324 + 0.0126 = 0.9450$.

7. CONCLUSION

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

----- End of Report -----