

# Test Report

Verified code: 333448

Report No.: E202409184352-8

Customer: Huizhou Foryou General Electronics Co., Ltd.

Address: No.2 District A, Foryou Industry Park, No. 1 North Shangxia Road, Dongjiang Hi tech Industry Park, 516005 Huizhou city, Guangdong Province, China(PROC)

Sample Name: Intelligent cabin controller

Sample Model: HS7024

Receive Sample Date: Sep.18,2024

Test Date: Sep.20,2024 ~ Oct.12,2024

Reference Document: 47 CFR, FCC Part 2.1091 Radio frequency radiation exposure evaluation: mobile devices

Test Result: Pass

Prepared by: Wen Wenwen      Reviewed by: Peng Huarui      Approved by: Zhao Zetian  
Wen Wenwen      Peng Huarui      Zhao Zetian

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2024-10-21

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**REPORT ISSUED HISTORY**

Report Version	Report No.	Description	Compile Date
1.0	E202409184352-8	Original Issue	2024-10-15

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## 1. GENERAL DESCRIPTION OF EUT

### 1.1 APPLICANT

Name: Huizhou Foryou General Electronics Co., Ltd.  
Address: No.2 District A, Foryou Industry Park, No. 1 North Shangxia Road, Dongjiang Hi tech Industry Park, 516005 Huizhou city, Guangdong Province, China(PROC)

### 1.2 MANUFACTURER

Name: Huizhou Foryou General Electronics Co., Ltd.  
Address: No.2 District A, Foryou Industry Park, No. 1 North Shangxia Road, Dongjiang Hi tech Industry Park, 516005 Huizhou city, Guangdong Province, China(PROC)

### 1.3 FACTORY

Name: Huizhou Foryou General Electronics Co., Ltd.  
Address: No.2 District A, Foryou Industry Park, No. 1 North Shangxia Road, Dongjiang Hi tech Industry Park, 516005 Huizhou city, Guangdong Province, China(PROC)

### 1.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment: Intelligent cabin controller  
Model No.: HS7024  
Trade Mark: ADAYO  
FCC ID: 2AEIN-HS7024  
Power Supply: DC 12V  
Battery: Ni-MH BATTERY AA1000mAh, LTT-HS7012A, LTT-AAP1000X3 3.6V  
BT: 2402MHz~2480MHz  
BLE: 2402MHz~2480MHz  
2.4G WiFi: 2412MHz~2462MHz  
5G WiFi U-NII-3: 5745MHz~5825MHz  
GSM850: Tx 824MHz~849MHz, Rx 869MHz ~ 894 MHz  
GSM1900: Tx 1850MHz~1910MHz, Rx 1930MHz ~ 1990 MHz  
UMTS Band 2: Tx 1850MHz~1910MHz, Rx 1930MHz ~ 1990 MHz  
Frequency Band: UMTS Band 4: Tx 1710MHz~1755MHz, Rx 2110MHz ~ 2155 MHz  
UMTS Band 5: Tx 824MHz~849MHz, Rx 869MHz ~ 894 MHz  
Band 2: Tx 1850MHz~1910MHz, Rx 1930MHz ~ 1990MHz  
Band 4: Tx 1710MHz~1755MHz, Rx 2110MHz ~ 2155MHz  
Band 5: Tx 824MHz~849MHz, Rx 869MHz ~ 894MHz  
Band 12: Tx 699MHz~716MHz, Rx 729MHz ~ 746MHz  
Band 13: Tx 777MHz~787MHz, Rx 746MHz ~ 756MHz  
Band 17: Tx 704MHz~716MHz, Rx 734MHz ~ 746MHz  
Modulation Type: BT: FHSS (GFSK for 1Mbps,  $\pi/4$ -DQPSK for 2Mbps, 8DPSK for 3Mbps );

	<p>BLE: GFSK;                  2.4G WiFi: DSSS for 802.11b mode, OFDM for 802.11g/n HT20/n HT40 mode;                  5G WiFi U-NII-3: IEEE 802.11a: OFDM, IEEE 802.11n: OFDM,                  IEEE 802.11ac: OFDM;                  GSM850: GMSK,8PSK;                  GSM1900: GMSK,8PSK;                  UMTS Band 2: QPSK;                  UMTS Band 4: QPSK;                  UMTS Band 5: QPSK;                  LTE: QPSK, 16QAM;</p>
Antenna Specification:	<p>BT: Internal Antenna with 4.98dBi gain (Max);                  BLE: Internal Antenna with 4.98dBi gain (Max);                  2.4G WiFi: Internal antenna with 5.71dBi gain (Max);                  5G WiFi U-NII-3: Internal antenna 1 with 5.45dBi antenna gain(max),                  Internal antenna 2 with 7.26dBi antenna gain(max);                  GSM850: 2.37dBi                  GSM1900: 3.62Bi                  UMTS Band 2:3.62dBi                  UMTS Band 4:3.69dBi                  UMTS Band 5:2.37dBi                  Band 2:3.62dBi                  Band 4: 3.69dBi                  Band 5:2.37dBi                  Band 12: -1.06dBi                  Band 13: 0.84dBi                  Band 17: -1.06dBi</p>
Temperature Range:	-40°C ~75°C
Voltage Range	9V~16V
Hardware Version:	B.0.1
Software Version:	SWC.0007
Sample submitting way:	<input checked="" type="checkbox"/> Provided by customer <input type="checkbox"/> Sampling
Sample No:	E202409184352-0001, E202409184352-0002

Note:

- The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.
- This EUT (Intelligent cabin controller) the model name HS7024 with High, Low two configuration. The two configuration have the same technical construction including circuit diagram, PCB LAYOUT, hardware version, software, except the High configuration with full function but the Low configuration without some functions as below table. These difference which are



not affect the RF performance. So only tested the high configuration of HS7024.

HS7024 Function	Configuration	
	High	Low
4MIC port	Y	N
DMS port	Y	N
Ethernet port	Y	N
Support PTZ camera port	Y	N
Integrated projection headlights port	Y	N

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## 2. LABORATORY

### 2.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

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### 2.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to GB/T 27025(ISO/IEC 17025:2017)

**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,  
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### 3. LIMITS FOR GENERAL POPULATION/UNCONTROLLEDEXPOSURE

#### General

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;  $\lambda$  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).

Formula (4.1):

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

#### 4. 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**

Mode	Antenna type	Internal Identification	Maximum antenna gain
BT	Internal antenna	Antenna 1	4.98dBi
BLE	Internal antenna	Antenna 1	4.98dBi
2.4G WiFi	Internal antenna	Antenna 1	5.71dBi
5G WiFi (U-NII-3)	Internal antenna	Antenna 1, 2	5.45dBi, 7.26dBi
GSM 850	Internal antenna	Main	2.37dBi
PCS 1900	Internal antenna	Main	3.62dBi
UMTS Band 2	Internal antenna	Main	3.62dBi
UMTS Band 4	Internal antenna	Main	3.69dBi
UMTS Band 5	Internal antenna	Main	2.37dBi
LTE Band 2	Internal antenna	Main	3.62dBi
LTE Band 4	Internal antenna	Main	3.69dBi
LTE Band 5	Internal antenna	Main	2.37dBi
LTE Band 12	Internal antenna	Main	-1.06dBi
LTE Band 13	Internal antenna	Main	0.84dBi
LTE Band 17	Internal antenna	Main	-1.06dBi

**Table 2 Transmit Power**

Mode	Maximum Output Power (dBm)	Maximum Tune-up Output power (dBm)
BT	6.65	6.00±2.00
BLE	2.33	2.00±2.00
2.4G WiFi	15.44	15.00±2.00
GSM 850	25.29	25.00±2.00
PCS 1900	23.30	23.00±2.00
UMTS Band 2	23.22	23.00±2.00
UMTS Band 4	23.48	23.00±2.00
UMTS Band 5	23.30	23.00±2.00
LTE Band 2	22.97	22.00±2.00
LTE Band 4	23.02	23.00±2.00
LTE Band 5	23.48	23.00±2.00
LTE Band 12	24.35	24.00±2.00
LTE Band 13	24.35	24.00±2.00

LTE Band 17	24.62	24.00±2.00
5GHz WiFi U-NII-3-antenna 1	4.84	4.00±2.00
5GHz WiFi U-NII-3-antenna 2	3.72	3.00±2.00

Note: The Maximum Output Power refer to report E202409184352-1/2/4/5/6/7. Other configurations of GPRS / EDGE are considered as secondary modes. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:

The duty cycle “x” of different time slots as below:

1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8

Based on the calculation formula:

Frame-averaged power = Burst averaged power + 10 log (x)

So,

Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03

Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02

Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26

Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01

## 5. ESTIMATION RESULT

### 5.1 MEASUREMENT RESULTS

#### STANDALONE MPE

Mode	Frequency (MHz)	Maximum Tune-up Output power (dBm)	Antenna Gain (dBi)	Maximum Tune-up EIRP (dBm)	ERP (dBm)	Maximum Tune-up ERP (W)	Threshold ERP(W)
BT	2402-2480	8	4.98	12.98	10.83	0.0121	0.768
BLE	2402-2480	4	4.98	8.98	6.83	0.0048	0.768
2.4G WiFi	2412-2462	17	5.71	22.71	20.56	0.1138	0.768
GSM 850	824-849	27	2.37	29.37	27.22	0.5272	4.219
PCS 1900	1850-1910	25	3.62	28.62	26.47	0.4436	0.768
UMTS Band 2	1850-1910	25	3.62	28.62	26.47	0.4436	0.768
UMTS Band 4	1710-1755	25	3.69	28.69	26.54	0.4508	0.768
UMTS Band 5	824-849	25	2.37	27.37	25.22	0.3327	4.219
LTE Band 2	1850-1910	24	3.62	27.62	25.47	0.3524	0.768
LTE Band 4	1710-1755	25	3.69	28.69	26.54	0.4508	0.768
LTE Band 5	824-849	25	2.37	27.37	25.22	0.3327	4.219
LTE Band 12	699-716	26	-1.06	24.94	22.79	0.1901	3.579
LTE Band 13	777-787	26	0.84	26.84	24.69	0.2944	3.978
LTE Band 17	704-716	26	-1.06	24.94	22.79	0.1901	3.604
5GHz WiFi U-NII-3-antenna 1	5745-5825	6	5.45	11.45	9.3	0.0085	0.768

5GHz WiFi U-NII-3 -antenna 2	5745-5825	5	7.26	12.26	10.11	0.0103	0.768
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Remark:

1. RF Exposure use distance is 20cm from manufacturer declaration of user manual.
2. For 1.5G-100GHz Threshold  $ERP(W) = 19.2R^2(W) = 19.2 * 0.2 * 0.2(W) = 0.768(W)$ . For 300MHz-1.5GHz Threshold  $ERP(W) = 0.0128 R^2$ .
3.  $ERP(dBm) = EIRP(dBm) - 2.15$ .

**Maximum Simultaneous transmission MPE Ratio for BT, BLE, 2.4G WiFi, 5G WiFi, GSM, WCDMA, LTE:**

Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	∑ MPEratios	Limit	Results
BT	2.4G wifi	5G WiFi-antenna 1	5G WiFi-antenna 2	GSM			
0.016	0.148	0.011	0.013	0.578	0.766	1.000	Pass

Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	∑ MPEratios	Limit	Results
BT	2.4G wifi	5G WiFi-antenna 1	5G WiFi-antenna 2	WCDMA			
0.016	0.148	0.011	0.013	0.587	0.775	1.000	Pass

Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	∑ MPEratios	Limit	Results
BT	2.4G wifi	5G WiFi-antenna 1	5G WiFi-antenna 2	LTE			
0.016	0.148	0.011	0.013	0.587	0.775	1.000	Pass

Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	∑ MPEratios	Limit	Results
BLE	2.4G wifi	5G WiFi-antenna 1	5G WiFi-antenna 2	GSM			
0.006	0.148	0.011	0.013	0.578	0.756	1.000	Pass

Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	Maximum MPE ratio	∑ MPEratios	Limit	Results
BLE	2.4G wifi	5G WiFi-antenna 1	5G WiFi-antenna 2	WCDMA			
0.006	0.148	0.011	0.013	0.587	0.765	1.000	Pass

Maximum MPE ratio BLE	Maximum MPE ratio 2.4G wifi	Maximum MPE ratio 5G WiFi-antenna 1	Maximum MPE ratio 5G WiFi-antenna 2	Maximum MPE ratio LTE	$\Sigma$ MPE ratios	Limit	Results
0.006	0.148	0.011	0.013	0.587	0.765	1.000	Pass

**Remark:**

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\Sigma$  of MPE ratios  $\leq$  1.0

**6. 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 -----