RF MPE REPORT

Report No.:	20241017G21082X-W5
Product Name:	GNSS/INS SYSTEM
Model No.:	CGI-830
FCC ID:	SY4-A02060
Applicant:	Shanghai Huace Navigation Technology Ltd.
Address:	577 Songying Road, Qingpu District, 201706 Shanghai, China
Dates of Testing:	10/23/2024 - 11/18/2024
Issued by:	CCIC Southern Testing Co., Ltd.
Lab Location:	Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China. **Tel**：86-755-26627338 **E-Mail**：manager@ccic-set.com

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Test Report

Product.....:	GNSS/INS SYSTEM
Trade Name .....:	CHCNAV
Applicant.....:	Shanghai Huace Navigation Technology Ltd.
Applicant Address.....:	577 Songying Road, Qingpu District, 201706 Shanghai, China
Manufacturer.....:	Shanghai Huace Navigation Technology Ltd.
Manufacturer Address.....:	577 Songying Road, Qingpu District, 201706 Shanghai, China
Test Standards.....:	47 CFR Part 2.1091
Test Result.....:	Pass

Tested by .....: 2024.11.18

Chuiwang Zhang, Test Engineer

Reviewed by.....: 2024.11.18

Sun Jiaohui, Senior Engineer

Approved by.....: 2024.11.18

Chris You, Manager

Table of Contents

Change History		
Issue	Date	Reason for change
1.0	2024.11.18	First edition

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	GNSS/INS SYSTEM	
Model No.	CGI-830	
EUT supports Radios application	GSM 850/1900 WCDMA Band 2/4/5 LTE Band 2/4/5/7/12/13/25/26/41 2.4G WIFI	
Frequency Range(UL)	WCDMA 850: 824MHz~849MHz WCDMA 1700: 1710MHz~1755MHz WCDMA 1900: 1850MHz~1910MHz	
	LTE Band 2: 1850MHz~1910MHz LTE Band 4: 1710MHz~1755MHz LTE Band 5: 824MHz~849MHz LTE Band 7: 2500MHz~2570MHz LTE Band 12: 699MHz~716MHz LTE Band 13: 777MHz~787MHz LTE Band 25: 1850MHz~1915MHz LTE Band 26: 814MHz~849MHz LTE Band 41: 2496MHz~2690MHz	
	2.4G WIFI: 2.412GHz ~ 2.462GHz	
Bandwidth		
	WCDMA B2/4/5:	5MHz
	LTE Band 2/4/25:	1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz
	LTE Band 26(Part 22):	1.4MHz/3MHz/5MHz/10MHz/15MHz
	LTE Band 26(Part 90):	1.4MHz/3MHz/5MHz/10MHz
	LTE Band 5/12:	1.4MHz/3MHz/5MHz/10MHz
	LTE Band 13:	5MHz/10MHz
	LTE Band 7/41:	5MHz/10MHz/15MHz/20MHz
	2.4G WIFI:	802.11b/g/n-HT20: 20MHz
Modulation Type	GSM	GPRS: GMSK EDGE: GMSK / 8PSK
	WCDMA	WCDMA: QPSK(Uplink) HSDPA: QPSK(Uplink) HSUPA: QPSK(Uplink)
	LTE	QPSK/16QAM/64QAM(downlink only)
	2.4G WIFI	DSSS (802.11b), OFDM (802.11g/n)

Antenna gain	GSM 850: -2.49dBi PCS 1900: -1.63dBi	
	WCDMA 850: -2.49dBi WCDMA 1700: -1.63dBi WCDMA 1900: -1.63dBi	
	LTE Band 2/25: -1.63dBi LTE Band 4: -1.63dBi LTE Band 5: -2.49dBi LTE Band 7/41: -2.01dBi LTE Band 12: -4.42dBi LTE Band 13: -2.49dBi LTE Band 26(Part 22): 0.64dBi LTE Band 26(Part 90): 0.91dBi	
	2.4G WIFI: -0.91dBi	
Antenna Type	2.4G WIFI:	Internal Antenna
	GSM/WCDMA/LTE:	External Antenna

Note 1: The information of antenna gain and cable loss is provided by the manufacturer and our lab is not responsible for the accuracy of the antenna gain and cable loss information.

1.2. EUT Description

EUT has been tested according to the following standards.

No.	Identity	Document Title
1	47 CFR Part 1	Practice and Procedure
2	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
3	KDB 447498 D01 General RF Exposure Guidance v06	RF Exposure Procedures and Equipment Authorization Policies for Mobile and Portable Devices
4	OET Bulletin 65 Edition 97-01	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

1.3. Laboratory Facilities

FCC-Registration No.: CN1283

CCIC Southern Testing Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Designation Number: CN1283, valid time is until Jun. 30th, 2025.

ISED Registration: 11185A

CCIC Southern Testing Co., Ltd. EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 11185A on Aug. 04, 2016, valid time is until Jun. 30th, 2025.

CAB number: CN0064

A2LA Code: 5721.01

CCIC-SET is a third party testing organization accredited by A2LA according to ISO/IEC 17025. The accreditation certificate number is 5721.01.

1.4. Laboratory Location

Company Name:	CCIC Southern Testing Co., Ltd.
Address:	Electronic Testing Building, No.43, Shahe Road, Xili Street, Nanshan District, Shenzhen, Guangdong, China

2. Technical Requirements Specification in CFR Title 47 Part 2.1091

2.1. Exposure Limits

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).

Table 1 to § 1.1310(e)(1) - Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm2)	Averaging Time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	< 6
3.0-30	1824/f	4.89/f	*(900/f^2)	< 6
30-300	61.4	0.163	1.0	< 6
300-1500	/	/	f/300	< 6
1500-100,000	/	/	5	< 6
(ii) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	< 30
1.34-30	824/f	2.19/f	*(180/f^2)	< 30
30-300	27.5	0.073	0.2	< 30
300-1500	/	/	f/1500	< 30
1500-100,000	/	/	1.0	< 30
Note: f = frequency in MHz. * = Plane-wave equivalent power density.				

2.2. Predication of MPE limit at a given distance

Refer to formulas on page 19 of OET Bulletin 65, Edition 97-01.

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

Where:

S = power density (in appropriate units, e.g. mW/cm^2)

P = power input to the antenna (in appropriate units, e.g., mW)

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the centre of radiation of the antenna (appropriate units, e.g., cm)

2.3. Evaluation Results

Worst-Case mode Conducted Output Power Results for 2.4G WLAN

Band	Mode	Frequency (MHz)	Maximum Output Power (dBm)	Max Tune up power (dBm)	Max Tune up power (mW)
2.4G WIFI	802.11b	2462	15.29	15±1	39.81

Worst-Case mode Conducted Output Power Results for WWAN

Band	Frequency (MHz)	Maximum Output power(dBm)	Max Tune up power (dBm)	Max Tune up power (mW)
GPRS 850	848.8	34.00	34±1	3162.28
GPRS 1900	1909.8	31.17	31±1	1584.89
WCDMA 850	846.6	23.33	23±1	251.19
WCDMA 1700	1732.6	23.66	23±1	251.19
WCDMA 1900	1880.0	23.91	23±1	251.19
LTE Band 2	1880.0	23.67	23±1	251.19
LTE Band 4	1732.5	24.21	24±1	316.23
LTE Band 5	844.0	23.88	23±1	251.19
LTE Band 7	2565.0	23.35	23±1	251.19
LTE Band 12	715.3	23.31	23±1	251.19
LTE Band 13	779.5	23.55	23±1	251.19
LTE Band 25	1860.0	24.19	24±1	316.23
LTE Band 26 (Part 90)	819.0	23.63	23±1	251.19
LTE Band 26 (Part 22)	836.5	23.87	23±1	251.19
LTE Band 41	2680.0	23.64	23±1	251.19

Calculation results: Worst-Case mode

Band	Antenna Gain (dBi)	Antenna Gain (numeric)	Distance (cm)	Result (mW/cm2)	Power Density (mW/cm2)	Ratio
2.4G WIFI	-0.91	0.81	20	0.006	1.00	**0.006**
GPRS 850	-2.49	0.56	20	0.355	0.57	**0.627**
GPRS 1900	-1.63	0.69	20	0.217	1.00	0.217
WCDMA 850	-2.49	0.56	20	0.028	0.56	0.050
WCDMA 1700	-1.63	0.69	20	0.034	1.00	0.034
WCDMA 1900	-1.63	0.69	20	0.034	1.00	0.034
LTE Band 2	-1.63	0.69	20	0.034	1.00	0.034
LTE Band 4	-1.63	0.69	20	0.043	1.00	0.043
LTE Band 5	-2.49	0.56	20	0.028	0.56	0.050
LTE Band 7	-2.01	0.63	20	0.031	1.00	0.031
LTE Band 12	-4.42	0.36	20	0.018	0.48	0.038
LTE Band 13	-2.49	0.56	20	0.028	0.52	0.054
LTE Band 25	-1.63	0.69	20	0.043	1.00	0.043
LTE Band 26 (Part 90)	-2.49	0.56	20	0.028	0.55	0.052
LTE Band 26 (Part 22)	-2.49	0.56	20	0.028	0.56	0.051
LTE Band 41	-2.01	0.63	20	0.031	1.00	0.031

Simultaneous Transmission Calculation (Worst-case mode)

No.	Transmitter Combinations	Scenario Supported or not
1	WWAN + 2.4G WLAN	Yes

Max Simultaneous Transmission Calculation (Worst-case mode)

No.	Worst Mode	MPE Ratio	Limit	Results
1	GPRS 850 + 2.4G WIFI	0.633	≤ 1.0	Pass

Note: MPE Ratio = 0.006 + 0.627 = 0.633.

2.4. Conclusion

According to the KDB 447498 D01 General RF Exposure Guidance v06 section 7.2 determine the device is exclusion from SAR test.

** END OF REPORT **