



SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

EMC-TRF-03 Rev 1.1

Report No.: GZCR240800092306

Page: 1 of 10

FCC ID: 2BARH-ULTRACRAFT

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2408000923AT
Applicant: GUANGZHOU HEYGEARS IMC. INC
Address of Applicant: BLOCK B2, 501, 601, ENTERPRISE ACCELERATOR, KAIFA DISTRICT, GUANGZHOU, GUANGDONG, CHINA
Manufacturer: GUANGZHOU HEYGEARS IMC. INC
Address of Manufacturer: BLOCK B2, 501, 601, ENTERPRISE ACCELERATOR, KAIFA DISTRICT, GUANGZHOU, GUANGDONG, CHINA
Factory: GUANGZHOU HEYGEARS IMC. INC
Address of Factory: BLOCK B2, 501, 601, ENTERPRISE ACCELERATOR, KAIFA DISTRICT, GUANGZHOU, GUANGDONG, CHINA
Product Name: ULtraCraft Rapid Production System
Model No.: UltraCraft A2D HD
Trade Mark: HEYGEARS
Standard(s) : 47 CFR Part 1.1310
KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2024-08-06
Date of Evaluation: 2024-08-22 to 2024-10-30
Date of Issue: 2024-11-15

Evaluation Result:

Pass*

* In the configuration evaluated, the EUT complied with the standards specified above.

Ricky Liu

Ricky Liu
Manager



SGS-CSTC Standards Technical Services Co., Ltd.
Guangzhou Branch Testing Center EEC Laboratory

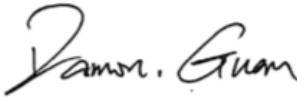
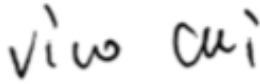
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Revision Record			
Version	Report No.	Date	Remark
01	GZCR240800092306	2024-11-15	Original

Authorized for issue by:			
			
		Damon Guan/Project Engineer	
			
		Vico Cui/Reviewer	

2 Evaluation Summary

Item	Standard	Method	Requirement	Result
RF Exposure	KDB447498 D01 General RF Exposure Guidance v06	KDB447498 D01 General RF Exposure Guidance v06	47 CFR Part 1.1310	Pass

Note:

E.U.T./EUT means Equipment Under Test.

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.

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4 General Information

4.1 Details of E.U.T.

Power supply: AC 100-240V, 50/60Hz, 340W
 Cable(s): About 1.6m x 3 wires unscreened AC mains cable.
 USB Port x2
 RJ45 Port x1
 4 Pin DC output Port x1(Reserved only, function not developed)
 Refer to report GZCR240800092302 for 2.4G Wi-Fi.
 RF Character(s): Refer to report GZCR240800092303 for 5G Wi-Fi.
 Refer to report GZCR240800092305 for 13.56M NFC.

Remark: The information in this section is provided by the applicant or manufacturer, SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

4.2 Evaluating Location

All tests were performed at:
 SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
 No.198, Kezhu Road, Science City, Economic & Technological Development Area, Guangzhou,
 Guangdong, China 510663
 Tel: +86 20 82155555
 No tests were sub-contracted.



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4.3 Facility

The facility is recognized, certified, or accredited by the following organizations:

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited 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: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.4 Deviation from Standards

None

4.5 Abnormalities from Standard Conditions

None



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5 Technical Requirements Specification

5.1 General Description of Applied Standards

KDB447498D01 General RF Exposure Guidance v06

4.3.1. Standalone SAR test exclusion considerations

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

5.2 RF Exposure Evaluation

5.2.1 Limit & Test Method

According to FCC Part1.1310: 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 part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/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
(B) 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

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * P_i * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

P_i = 3.1416

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

P_d 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.



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5.2.2 Conclusion

Normal use condition for
Distance between antenna and body: ≥ 20 declared by applicant

For 13.56MHz NFC:

Test Mode	Test Channel[MHz]	Power[dBuV/m]	Test distance[m]	E-field(V/m)	Limit of E-field(V/m)	Test Result
ASK	13.56	68.91	3	0.6276	60.76696165	Complies

Limit of E-field(V/m)=824/13.56=60.77(V/m)

2, RF Exposure Calculation

The max Radiated Power is 68.91 dBuV/m@ 3 m.

According to the formula, calculate the P test result:

$E(\text{dBuV/m})@0.2\text{m} = E(\text{dBuV/m})@3\text{m} + 40 \cdot \log[E(\text{dBuV/m})@0.2\text{m}/3] = 115.95 \text{ (dBuV/m)}@0.2\text{m}$

$E(\text{V/m})@0.2\text{m} = 10^{[E(\text{dBuV/m})@0.2\text{m}/20]} \cdot 10^{-6} = 0.6276 \text{ (V/m)}@0.2\text{m}$

For 2.4 GHz Wi-Fi

Antenna Gain: 2.25 dBi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
802.11B						
2412	1.678804018	8.62	7.28	0.00243	1	Complies
2437	1.678804018	8.8	7.59	0.00253	1	Complies
2462	1.678804018	8.33	6.81	0.00227	1	Complies
802.11G						
2412	1.678804018	11.05	12.74	0.00425	1	Complies
2437	1.678804018	10.98	12.53	0.00419	1	Complies
2462	1.678804018	10.53	11.30	0.00377	1	Complies
802.11N20						
2412	1.678804018	11.59	14.42	0.00482	1	Complies
2437	1.678804018	11.59	14.42	0.00482	1	Complies
2462	1.678804018	11.27	13.40	0.00447	1	Complies

For 5 GHz Wi-Fi

Antenna Gain: 2.48 dBi

Frequency (MHz)	Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S)	Test Result
					(mW/cm ²)	
802.11a						
5180	1.770108958	6.57	4.54	0.00160	1	Complies
5200	1.770108958	6.15	4.12	0.00145	1	Complies
5240	1.770108958	5.96	3.94	0.00139	1	Complies
5260	1.770108958	5.91	3.90	0.00137	1	Complies
5300	1.770108958	5.35	3.43	0.00121	1	Complies
5320	1.770108958	6.15	4.12	0.00145	1	Complies
5500	1.770108958	5.76	3.77	0.00133	1	Complies
5580	1.770108958	6.27	4.24	0.00149	1	Complies
5700	1.770108958	5.81	3.81	0.00134	1	Complies
5745	1.770108958	5.63	3.66	0.00129	1	Complies
5785	1.770108958	5.86	3.85	0.00136	1	Complies
5825	1.770108958	6	3.98	0.00140	1	Complies
802.11(HT40)						
5190	1.770108958	7.14	5.18	0.00182	1	Complies
5230	1.770108958	6.69	4.67	0.00164	1	Complies
5270	1.770108958	6.57	4.54	0.00160	1	Complies
5310	1.770108958	6.13	4.10	0.00144	1	Complies
5510	1.770108958	6.08	4.06	0.00143	1	Complies
5550	1.770108958	6.48	4.45	0.00157	1	Complies
5670	1.770108958	5.81	3.81	0.00134	1	Complies
5755	1.770108958	5.4	3.47	0.00122	1	Complies
5795	1.770108958	5.87	3.86	0.00136	1	Complies
802.11ac(VHT80)						
5210	1.770108958	5.85	3.85	0.00135	1	Complies
5290	1.770108958	5.17	3.29	0.00116	1	Complies
5530	1.770108958	5.16	3.28	0.00116	1	Complies
5610	1.770108958	5.12	3.25	0.00114	1	Complies
5775	1.770108958	4.42	2.77	0.00097	1	Complies

The NFC, Bluetooth and Wi-Fi can be transmitted simultaneously, the result is

$0.6276/60.77+0.00482/1+0.00182/1=0.016967<1.0$

The EUT meet the Exemption Limits for Routine Evaluation – SAR Evaluation, so no SAR evaluation is required for the EUT.

Note: Refer to report No. GZCR240800092302, GZCR240800092303, GZCR240800092305 for EUT test Max Conducted Peak Output Power value.



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6 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2408000923AT

- End of the Report -



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