

RF EXPOSURE EVALUATION REPORT

Application No.: GZCR2111021426AT
Applicant: Mesh Systems LLC
Address of Applicant: 1920 N Casaloma Drive Appleton Wisconsin 54913 United States
Manufacturer: SICHUAN CHANGHONG NETWORK TECHNOLOGIES CO., LTD.
Address of Manufacturer: Room 529, No.2 building, Innovation center (phase II), Science and education entrepreneurship Park, Mianyang, Sichuan, China
Factory: SICHUAN CHANGHONG NETWORK FACTORY
Address of Factory: G05 Factory Premises, Changhong Intelligent Display Terminal Industrial Park, No.38, Xiping Avenue, High-Tech District, Mianyang City, 621000, Sichuan P.R.China

Equipment Under Test (EUT):

EUT Name: smart base
Model No.: SST200
FCC ID: 2AC46-SST200
Standard(s) : 47 CFR Part 1.1307
 47 CFR Part 1.1310
 47 CFR Part 2.1091

Date of Receipt: 2021-12-02
Date of Evaluation: 2021-12-02 to 2021-12-21
Date of Issue: 2021-12-22

Evaluation Result:	Pass*
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* In the configuration evaluated, the EUT complied with the standards specified above.

Kobe Jian
EMC Laboratory Manager



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<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2021-12-22		Original

Authorized for issue by			
			
		<hr/> Curry Wu/Project Engineer	
			
		<hr/> Ricky Liu/Reviewer	



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2 Evaluation Summary

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: DC 6V (1.5V AA*4).

For BLE:

Operation Frequency: 2402MHz to 2480MHz
 Bluetooth Version: V5.0
 Modulation Type: GFSK
 Data Rate: 1Mbps & 2Mbps
 Number of Channels: 40
 Channel Spacing: 2MHz
 Antenna Type: PCB Antenna
 Antenna Gain: 1.0dBi

For WiFi 2.4G:

Operation Frequency: 802.11b/g/n (HT20): 2412MHz to 2462MHz
 Modulation Type: 802.11b: DSSS (CCK, DQPSK, DBPSK)
 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
 Number of Channels: 802.11b/g/n (HT20): 11
 Channel Spacing: 5MHz
 Antenna Type: Chip Antenna
 Antenna Gain: 1.5dBi

For WiFi 5.8G:

Operation Frequency (20MHz): U-NII-3: 5745-5825MHz
 Modulation Type: 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
 Channel Spacing: 802.11n(HT20): 20MHz
 Channel Number: 5
 Antenna Type: Chip Antenna
 Antenna Gain: 1.5dBi

4.2 Evaluating Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
 198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
 Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.



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 Guangzhou Branch EMC Laboratory, 中国·广州·经济技术开发区科学城科珠路198号 邮编: 510663 t (86-20) 82155555 f (86-20) 82075058 sgs.china@sgs.com

4.3 Facility

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

- **NVLAP (Lab Code: 200611-0)**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

- **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.

- **CNAS (Lab Code: L0167)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2018 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of Testing Laboratories.

- **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 Radio Spectrum Technical Requirement

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d id 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.

5.1.2 Test Procedure

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



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5.1.3 EUT RF Exposure Evaluation

For BLE:

Antenna Gain: 1.0dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2402	-1.69	0.68	0.0002	1.0	PASS

For 2.4GHz WIFI:

Antenna Gain: 1.5dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
2462	16.43	43.95	0.0124	1.0	PASS

For 5GHz WIFI:

Antenna Gain: 1.5dBi

Output Power Into Antenna & RF Exposure Evaluation Distance:

Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
5825	16.19	41.59	0.0117	1.0	PASS

Note: Refer to report No. GZCR211102142601, GZCR211102142602 GZCR211102142603 for EUT test Max Conducted Peak Output Power Value.

Exposure conditions for simultaneous transmission operations

WiFi 2.4G and WiFi 5.8G can't be work at the same time. Simultaneous transmission MPE test is not required, because the Max. sum of the MPE ratios for WiFi 2.4G and BLE is $0.0002/1.0+0.0124/1.0=0.0126 < 1$

The distance r (4th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.



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6 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for GZCR2111021426AT

- End of the Report -



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