



SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

SHEM-TRF-001 Rev. 02 Sep01, 2023

Report No.: SHCR231100237807

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1 Cover Page

RF Exposure Evaluation Report

Application No.: SHCR2311002378EV
Applicant: CSE Energy&Technology Co.,Ltd
Address of Applicant: Building S4, No.777, Sizhuan Road, Shanghai, China
Manufacturer: CSE Energy&Technology Co.,Ltd
Address of Manufacturer: Building S4, No.777, Sizhuan Road, Shanghai, China
Equipment Under Test (EUT):
EUT Name: AC charging pile of electric vehicle
Model No.: CSE-BCG-AT32-K01-3-CE
Add Model No.: CSE-BCG-AT32-K01-1-CE, CSG-BCG-AT32/K03-3-CE, CSE-BCG-AT16-K01-3-CE, CSG-BCG-AT16/K03-3-CE, CSG-BCG-AT16/K04-3-CE, CSE-BCG-AT16-K01-1-CE
Trade Mark: CSE, power4 Homeby cse
Standard(s) : EN IEC 62311:2020
Date of Receipt: 2023-10-09
Date of Test: 2023-10-17 to 2023-11-01
Date of Issue: 2023-11-21

| | |
|---------------------|--------------|
| Test Result: | Pass* |
|---------------------|--------------|

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

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



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| Revision Record | | | |
|-----------------|-------------|------------|--------------------------|
| Version | Description | Date | Remark |
| 00 | Co-license | 2023-11-21 | Base on SHCR231000209307 |
| | | | |
| | | | |

| | | | | |
|--------------------------|--|--------------------------|--|--|
| Authorized for issue by: | | | | |
| Tested By | | Bill Wu | | |
| | | Bill Wu/Project Engineer | | |
| Approved By | | Parlam Zhan | | |
| | | Parlam Zhan / Reviewer | | |



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3 General Information

3.1 General Description of E.U.T.

| | |
|---------------|--------------|
| Power supply: | AC 380V/50Hz |
|---------------|--------------|

3.2 Technical Specifications

BLE

| | |
|----------------------|----------------------------------|
| Operation Frequency: | 2402MHz to 2480MHz |
| Modulation Type: | GFSK |
| Channel Spacing: | 2MHz |
| Number of Channels: | 40 |
| Receiver Category: | 2 |
| Antenna Gain: | 2 dBi (Provided by manufacturer) |
| Antenna Type: | PCB Antenna |

2.4GHz WiFi

| | |
|----------------------|---|
| Operation Frequency: | 802.11b/g/n(HT20): 2412MHz to 2472MHz |
| Modulation Type: | 802.11b: DSSS (CCK, DQPSK, DBPSK), 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK) |
| Channel Spacing: | 5MHz |
| Number of Channels: | 802.11b/g/n(HT20): 13 |
| Receiver Category: | 1 |
| Antenna Gain: | 2 dBi (Provided by manufacturer) |
| Antenna Type: | PCB Antenna |

NFC

| | |
|----------------------|--------------|
| Operation Frequency: | 13.56MHz |
| Modulation Type: | ASK |
| Antenna Type: | Loop Antenna |

GSM

| Frequency Band: | Band | Tx (MHz) | Rx (MHz) |
|---------------------|------------------------------------|-----------|-----------|
| | E-GSM900 | 880-915 | 925-960 |
| | DCS1800 | 1710-1785 | 1805-1880 |
| Type of Modulation: | GMSK(GSM/GPRS/EGPRS), 8PSK (EGPRS) | | |
| Sample Type: | Module equipment | | |
| Antenna Type: | External Antenna | | |
| Antenna Gain: | 3dBi (Provided by manufacturer) | | |

LTE

| | LTE BAND | Duplex Mode | Uplink (MHz) | Downlink (MHz) | Supported Channel Bandwidth | | | | | |
|-----------------|----------------------------------|--|--------------|----------------|-----------------------------|-----|---|----|-----|-----|
| | | | | | 1.4 | 3 | 5 | 10 | 15 | 20 |
| Frequency Band: | 1 | FDD | 1920-1980 | 2110-2170 | --- | --- | ☒ | ☒ | ☒ | ☒ |
| | 3 | FDD | 1710-1785 | 1805-1880 | ☒ | ☒ | ☒ | ☒ | ☒ | ☒ |
| | 7 | FDD | 2500-2570 | 2620-2690 | --- | --- | ☒ | ☒ | ☒ | ☒ |
| | 8 | FDD | 880-915 | 925-960 | ☒ | ☒ | ☒ | ☒ | --- | --- |
| | 20 | FDD | 791-821 | 832-862 | --- | --- | ☒ | ☒ | ☒ | ☒ |
| | 28 | FDD | 703-748 | 758-803 | --- | ☒ | ☒ | ☒ | ☒ | ☒ |
| | Type of Modulation: | UL: QPSK,16QAM DL: QPSK,16QAM,64QAM | | | | | | | | |
| Sample Type: | Module equipment | | | | | | | | | |
| Antenna Type: | External Antenna | | | | | | | | | |
| Antenna Gain: | 3dBi (Provided by manufacturer); | | | | | | | | | |

3.3 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g. max. clock frequency, highest internal frequency, antenna gain, cable loss, etc) is provided by the applicant. (if applicable).
2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (if applicable).
3. Sample source: sent by customer.

3.4 Test Facility

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

- **A2LA (Certificate No. 6332.01)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

- **FCC (Designation Number: CN1301)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

- **ISED (CAB Identifier: CN0020)**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4 Test Standards and Limits

The evaluation has been performed on the EUT, pursuant to the relevant requirements of the following document(s) and the harmonized EN standard(s) covering essential requirements under article 3.1a of the RED Directive (2014/53/EU).

| Identity | Document Title | Version |
|---|--|---------|
| Council Recommendation of 12 July 1999(1999/519/EC) | On the limitation of exposure of the general public to electromagnetic fields (0Hz to 300GHz) | 1999 |
| EN IEC 62311 | Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz) | 2020 |

Limit: According to EN IEC 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.

Table 2
Reference levels for electric, magnetic and electromagnetic fields
(0 Hz to 300 GHz, unperturbed rms values)

| Frequency range | E-field strength (V/m) | H-field strength (A/m) | B-field (μT) | Equivalent plane wave power density S_{eq} (W/m ²) |
|-----------------|------------------------|------------------------|---------------------|--|
| 0-1 Hz | — | $3,2 \times 10^4$ | 4×10^4 | — |
| 1-8 Hz | 10 000 | $3,2 \times 10^4/f^2$ | $4 \times 10^4/f^2$ | — |
| 8-25 Hz | 10 000 | $4\,000/f$ | $5\,000/f$ | — |
| 0,025-0,8 kHz | $250/f$ | $4/f$ | $5/f$ | — |
| 0,8-3 kHz | $250/f$ | 5 | 6,25 | — |
| 3-150 kHz | 87 | 5 | 6,25 | — |
| 0,15-1 MHz | 87 | $0,73/f$ | $0,92/f$ | — |
| 1-10 MHz | $87/f^{1/2}$ | $0,73/f$ | $0,92/f$ | — |
| 10-400 MHz | 28 | 0,073 | 0,092 | 2 |
| 400-2 000 MHz | $1,375 f^{1/2}$ | $0,0037 f^{1/2}$ | $0,0046 f^{1/2}$ | $f/200$ |
| 2-300 GHz | 61 | 0,16 | 0,20 | 10 |

Notes:

1. f as indicated in the frequency range column.
2. For frequencies between 100 kHz and 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10 GHz, S_{eq} , E^2 , H^2 , and B^2 are to be averaged over any $68/f^{1.05}$ -minute period (f in GHz).
4. No E-field value is provided for frequencies < 1 Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 25 kV/m. Spark discharges causing stress or annoyance should be avoided.



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Note1: The limit of power density

2.4G is 10W/m^2 ;

13.56MHz is 0.073A/m ;

GSM 900: 4.4 W/m^2 ;

DCS 1800: 8.55 W/m^2

WCDMA band I: 9.6 W/m^2 ;

WCDMA band VIII: 4.4 W/m^2 ;

FDD band 1: 9.25 W/m^2 ;

FDD band 3: 8.55 W/m^2 ;

FDD band 7: 10 W/m^2 ;

FDD band 8: 4.4 W/m^2 ;

FDD band 20: 4.2 W/m^2 ;

FDD band 28: 3.74W/m^2 ;

5 Calculation Formula and Test Result

5.1 Calculation Formula

$$Pd = (Pout * G) / 4\pi R^2$$

Where:

Pd = Power density in W/m²

Pout = Output power to antenna in W

G = Antenna Gain in linear scale

π = 3.14

R = distance to the center of radiation of antenna (in meter) = 0.2m

NOTE: Pd limit = 10W/m².

5.2 Calculation Results

The EIRP Data is based on the RF Test Report BLE-ETSP-1-2111H032, BLE-ETSP-2-2111H032, 2203RSU066-E1, 2203RSU066-E4

| Test Mode | Frequency Band (MHz) | Average EIRP (dBm) | Result of Power Density S (W/m ²) | Limit of Power Density S (W/m ²) |
|-------------|----------------------|--------------------|---|--|
| BLE | 2402~2480 | 9.0 | 0.02 | 10 |
| 2.4GHz WiFi | 2412~2472 | 18.5 | 0.14 | 10 |

| Test Mode | Frequency Band (MHz) | Maximum Output Power(dBm) | Average EIRP (dBm) | Result of Power Density S (W/m ²) | Limit of Power Density S (W/m ²) |
|-----------|----------------------|---------------------------|--------------------|---|--|
| GSM 900 | 880~915 | 26 | 29 | 1.58 | 4.40 |
| GSM 1800 | 1710~1785 | 23 | 26 | 0.79 | 8.55 |

The averaged power calculated method are shown as below:

Averaged power=Maximum burst averaged power (1 Tx Slot) + (10lg(1/8))dB

Averaged power=Maximum burst averaged power (2 Tx Slot) + (10lg(2/8))dB

Averaged power=Maximum burst averaged power (3 Tx Slot) + (10lg(3/8))dB

Averaged power=Maximum burst averaged power (4 Tx Slot) + (10lg(4/8))dB

Average EIRP Power=Average Power + Antenna Gain



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| Test Mode | Frequency Band (MHz) | Maximum Output Power(dBm) | Average EIRP (dBm) | Result of Power Density S (W/m ²) | Limit of Power Density S (W/m ²) |
|-------------|----------------------|---------------------------|--------------------|---|--|
| LTE Band 1 | 1920-1980 | 25.7 | 28.7 | 1.48 | 9.25 |
| LTE Band 3 | 1710-1785 | 25.7 | 28.7 | 1.48 | 8.55 |
| LTE Band 7 | 2500-2570 | 25.7 | 28.7 | 1.48 | 10 |
| LTE Band 8 | 880-915 | 25.7 | 28.7 | 1.48 | 4.4 |
| LTE Band 20 | 832-862 | 25.7 | 28.7 | 1.48 | 4.2 |
| LTE Band 28 | 703-748 | 25.7 | 28.7 | 1.48 | 3.74 |

The averaged power calculated method are shown as below:
Average EIRP Power= Maximum Output Power+ Antenna Gain

For 13.56MHz:

Refer to the test report SHCR231100237804, the measured maximum Magnetic Fields is 2.90dBuA/m (0.0000014A/m). This is below the max permitted sending level of 0.073A/m, so the device meets the requirements.

The WiFi and BLE and LTE and 13.56MHz can simultaneous transmitting. But the maximum rate of MPE is $0.14/10+0.02/10+1.48/3.74+0.0000014/0.073=0.40 \leq 1$, and then the EUT is not need to conduct SAR measurement.

Then the EUT is not need to conduct SAR measurement.

-The End of Report-