

# RF EXPOSURE EVALUATION REPORT

**Application No.:** GZCR2303000230AT  
**Applicant:** ABB Electrical Equipment (Xiamen) Co., Ltd.  
**Address of Applicant:** No.885, FangShanXiEr Road, Xiang'an District, Xiamen, Fujian, China  
**Manufacturer:** ABB Xiamen Switchgear Co., Ltd.  
**Address of Manufacturer:** No.885, FangShanXiEr Road, Xiang'an District, Xiamen, Fujian, China  
**Factory:** ABB Xiamen Switchgear Co., Ltd.  
**Address of Factory:** No.885, FangShanXiEr Road, Xiang'an District, Xiamen, Fujian, China  
**Equipment Under Test (EUT):**  
**EUT Name:** Temperature Sensor  
**Model No.:** STX301, STX311, STX303, STX313 ♣  
 ♣ Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.  
**Standard(s) :** 47 CFR Part 1.1310  
 KDB447498D01 General RF Exposure Guidance v06  
**Date of Receipt:** 2023-03-06  
**Date of Evaluation:** 2023-03-24 to 2023-03-24  
**Date of Issue:** 2023-03-31

**Evaluation Result:**

**Pass\***

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

*Ricky Liu*

Ricky Liu  
Manager



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| Revision Record |                  |            |          |
|-----------------|------------------|------------|----------|
| Version         | Report No.       | Date       | Remark   |
| 01              | GZCR230300023003 | 2023-03-31 | Original |
|                 |                  |            |          |
|                 |                  |            |          |

|                          |  |                              |  |
|--------------------------|--|------------------------------|--|
| Authorized for issue by: |  |                              |  |
|                          |  | Kevin Zhang                  |  |
|                          |  | Kevin Zhang/Project Engineer |  |
|                          |  | Vico Cui                     |  |
|                          |  | Vico Cui/Reviewer            |  |



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## 2 Evaluation Summary

| Item       | Standard                                               | Method                                              | Requirement        | Result |
|------------|--------------------------------------------------------|-----------------------------------------------------|--------------------|--------|
| Evaluation | KDB447498D01<br>General RF<br>Exposure<br>Guidance v06 | KDB447498D01<br>General RF Exposure<br>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.

♣Declaration of EUT Family Grouping:

Model No.: STX301, STX311, STX303, STX313

According to the declaration from the applicant, the electrical circuit design, PCB layout, components used and internal wiring were identical for all models, with only difference on the model name, application layer protocol and number of temperature probe.

Therefore, only one model STX303 was evaluated in this report.

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## 4 General Information

### 4.1 Details of E.U.T.

|                      |                                   |
|----------------------|-----------------------------------|
| Power supply:        | Powered by load current           |
| Cable(s):            | Sensor cables (unshielded, 40 cm) |
| Operation Frequency: | 2403MHz to 2480MHz                |
| Modulation Type:     | O-QPSK                            |
| Number of Channels:  | 78                                |
| Channel Spacing:     | 1MHz                              |
| Antenna Type:        | Integral Antenna                  |
| Antenna Gain:        | 0.5 dBi                           |
| Antenna Number:      | 1                                 |

### 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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## 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 <sup>2</sup> ) | Averaging time (minutes) |
|----------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------------|--------------------------|
| <b>(A) Limits for Occupational/Controlled Exposures</b>        |                               |                               |                                     |                          |
| 0.3–3.0 .....                                                  | 614                           | 1.63                          | *(100)                              | 6                        |
| 3.0–30 .....                                                   | 1842/f                        | 4.89/f                        | *(900/f <sup>2</sup> )              | 6                        |
| 30–300 .....                                                   | 61.4                          | 0.163                         | 1.0                                 | 6                        |
| 300–1500 .....                                                 | .....                         | .....                         | f/300                               | 6                        |
| 1500–100,000 .....                                             | .....                         | .....                         | 5                                   | 6                        |
| <b>(B) Limits for General Population/Uncontrolled Exposure</b> |                               |                               |                                     |                          |
| 0.3–1.34 .....                                                 | 614                           | 1.63                          | *(100)                              | 30                       |
| 1.34–30 .....                                                  | 824/f                         | 2.19/f                        | *(180/f <sup>2</sup> )              | 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/cm<sup>2</sup>

$P_{out}$  = 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/cm<sup>2</sup>. 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.

## 5.2.2 Conclusion

Normal use condition for  
Distance between antenna and body: 20cm declared by applicant  
Antenna Gain: 1.5 dBi

| Frequency (MHz) | Antenna Gain (Numeric) | Peak Output Power (dBm) | Peak Output Power (mW) | Power Density (S) (mW/cm <sup>2</sup> ) | Limit of Power Density (S) (mW/cm <sup>2</sup> ) | Test Result |
|-----------------|------------------------|-------------------------|------------------------|-----------------------------------------|--------------------------------------------------|-------------|
| 2403            | 1.413                  | -2.76                   | 0.530                  | 0.00015                                 | 1                                                | Complies    |
| 2440            | 1.413                  | -3.09                   | 0.491                  | 0.00014                                 | 1                                                | Complies    |
| 2480            | 1.413                  | -2.96                   | 0.506                  | 0.00014                                 | 1                                                | Complies    |

So SAR report is not required.

Note: Refer to report No. GZCR230300023002 for EUT test Max Conducted Peak Output Power value.



## 6 EUT Constructional Details (EUT Photos)

Refer to External and Internal Photos for GZCR2303000230AT

- End of the Report -