

# TEST REPORT

**Applicant:** SG Wireless Limited  
**Address:** Unit 4, 5/F, Sun Fung Industrial Building, 8 Ma Kok Street, Tsuen Wan, New Territories, Hong Kong  
**Equipment Type:** F1 Smart Module  
**Model Name:** SGW3101  
**Brand Name:** SG Wireless  
**FCC ID:** 2AS9409  
**Test Standard:** 47 CFR Part 2.1091  
KDB 447498 D04 v01  
**Sample Arrival Date:** Sep. 23, 2024  
**Test Date:** May 15, 2025 - May 16, 2025  
**Date of Issue:** Jun. 19, 2025

**ISSUED BY:**

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Xu Rui

**Checked by:** Zong Liyao

**Approved by:** Tolan Tu

(Testing Director)

*Xu Rui*

*Liyao Zong*

*Tolan Tu*

**Revision History**

| <u>Version</u> | <u>Issue Date</u>    | <u>Revisions Content</u> |
|----------------|----------------------|--------------------------|
| <u>Rev. 01</u> | <u>Jun. 19, 2025</u> | <u>Initial Issue</u>     |

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# 1 GENERAL INFORMATION

## 1.1 Test Laboratory

|              |                                                                                                                              |
|--------------|------------------------------------------------------------------------------------------------------------------------------|
| Name         | Shenzhen BALUN Technology Co., Ltd.                                                                                          |
| Address      | Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Phone Number | +86 755 6685 0100                                                                                                            |

## 1.2 Test Location

|                           |                                                                                                                                                                                                                                    |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                      | Shenzhen BALUN Technology Co., Ltd.                                                                                                                                                                                                |
| Location                  | <input type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China                                                                              |
|                           | <input checked="" type="checkbox"/> 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Accreditation Certificate | The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.                                                                                                   |

## 2 PRODUCT INFORMATION

### 2.1 Applicant Information

|           |                                                                                                   |
|-----------|---------------------------------------------------------------------------------------------------|
| Applicant | SG Wireless Limited                                                                               |
| Address   | Unit 4, 5/F, Sun Fung Industrial Building, 8 Ma Kok Street, Tsuen Wan, New Territories, Hong Kong |

### 2.2 Manufacturer Information

|              |                                                                                                   |
|--------------|---------------------------------------------------------------------------------------------------|
| Manufacturer | SG Wireless Limited                                                                               |
| Address      | Unit 4, 5/F, Sun Fung Industrial Building, 8 Ma Kok Street, Tsuen Wan, New Territories, Hong Kong |

### 2.3 General Description for Equipment under Test (EUT)

|                                           |                 |
|-------------------------------------------|-----------------|
| EUT Name                                  | F1 Smart Module |
| Model Name Under Test                     | SGW3101         |
| Series Model Name                         | N/A             |
| Description of Model name differentiation | N/A             |
| Hardware Version                          | 1.2.3           |
| Software Version                          | B0.2.0b0        |
| Dimensions (Approx.)                      | N/A             |
| Weight (Approx.)                          | N/A             |

### 2.4 Technical Information

|                                   |                                                            |
|-----------------------------------|------------------------------------------------------------|
| Network and Wireless connectivity | Bluetooth (BLE)<br>WIFI 802.11b, 802.11g, 802.11n(HT20/40) |
|-----------------------------------|------------------------------------------------------------|

The requirement for the following technical information of the EUT was tested in this report:

|                   |                                                                             |                 |
|-------------------|-----------------------------------------------------------------------------|-----------------|
| Operating Mode    | Bluetooth, WIFI                                                             |                 |
| Frequency Range   | Bluetooth                                                                   | 2400 ~ 2480 MHz |
|                   | 802.11b/g                                                                   | 2412 ~ 2462 MHz |
|                   | 802.11n(HT20/HT40)                                                          | 2412 ~ 2462 MHz |
| Antenna Type      | Bluetooth: Monopole Antenna (External)<br>WLAN: Monopole Antenna (External) |                 |
| Exposure Category | General Population/Uncontrolled Exposure                                    |                 |
| Product Type      | Mobile Device                                                               |                 |

### 3 SUMMARY OF TEST RESULT

#### 3.1 Test Standards

| No. | Identity           | Document Title                                      |
|-----|--------------------|-----------------------------------------------------|
| 1   | KDB 447498 D04 v01 | 447498 D04 Interim General RF Exposure Guidance v01 |

#### 3.2 Limit Standards

| No. | Identity           | Document Title                                               |
|-----|--------------------|--------------------------------------------------------------|
| 1   | 47 CFR Part 2.1091 | Radiofrequency radiation exposure evaluation: mobile devices |

## 4 DEVICE CATEGORY AND LEVELS LIMITS

### Mobile Devices:

CFR Title 47 §2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

### FCC KDB 447498 D04 General RF Exposure Guidance v01 Limit

Evaluation of compliance with the exposure limits in § 1.1310 is necessary if the ERP of the device is greater than ERP<sub>20cm</sub> in Formula (B.1) [repeated from § 2.1091(c)(1) and § 1.1307(b)(1)(i)(B)].

$$P_{th} \text{ (mW)} = ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases} \quad (\text{B.1})$$

If the ERP is not easily obtained, then the available maximum time-averaged power may be used (i. e., without consideration of ERP only if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole.

SAR-based exemptions are constant at separation distances between 20 cm and 40 cm to avoid discontinuities in the threshold when transitioning between SAR-based and MPE-based exemption criteria at 40 cm, considering the importance of reflections.

The SAR-based exemption formula of § 1.1307(b)(3)(i)(B), repeated here as Formula (B.2), applies for single fixed, mobile, and portable RF sources with available maximum time-averaged power or effective radiated power (ERP), whichever is greater, of less than or equal to the threshold  $P_{th}$  (mW).

This method shall only be used at separation distances from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by Formula (B.2).

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B. 2})$$

where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right)$$

and  $f$  is in GHz,  $d$  is the separation distance (cm), and  $ERP_{20 \text{ cm}}$  is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

| Frequency (MHz) | Distance (mm) |    |    |    |     |     |     |     |     |     |     |
|-----------------|---------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|
|                 |               | 5  | 10 | 15 | 20  | 25  | 30  | 35  | 40  | 45  | 50  |
| 300             |               | 39 | 65 | 88 | 110 | 129 | 148 | 166 | 184 | 201 | 217 |
| 450             |               | 22 | 44 | 67 | 89  | 112 | 135 | 158 | 180 | 203 | 226 |
| 835             |               | 9  | 25 | 44 | 66  | 90  | 116 | 145 | 175 | 207 | 240 |
| 1900            |               | 3  | 12 | 26 | 44  | 66  | 92  | 122 | 157 | 195 | 236 |
| 2450            |               | 3  | 10 | 22 | 38  | 59  | 83  | 111 | 143 | 179 | 219 |
| 3600            |               | 2  | 8  | 18 | 32  | 49  | 71  | 96  | 125 | 158 | 195 |
| 5800            |               | 1  | 6  | 14 | 25  | 40  | 58  | 80  | 106 | 136 | 169 |

## 5 ASSESSMENT RESULT

### 5.1 Output Power

#### SGW3531

| Mode                                                                                                          | Bluetooth |
|---------------------------------------------------------------------------------------------------------------|-----------|
| Conducted Power (dBm)                                                                                         | 18.23     |
| Antenna Gain (dBi)                                                                                            | 3.00      |
| EIRP (dBm)                                                                                                    | 21.23     |
| Note: This table listed the worst case power value, please refer to BL-SZ2430170-601 report for more details. |           |

| Mode                                                                                                          | 2.4G WIFI |
|---------------------------------------------------------------------------------------------------------------|-----------|
| Conducted Power (dBm)                                                                                         | 15.99     |
| Antenna Gain (dBi)                                                                                            | 3.00      |
| EIRP (dBm)                                                                                                    | 18.99     |
| Note: This table listed the worst case power value, please refer to BL-SZ2430170-602 report for more details. |           |

#### SGW3101

| Mode                                                                                                          | Bluetooth |
|---------------------------------------------------------------------------------------------------------------|-----------|
| Conducted Power (dBm)                                                                                         | 15.51     |
| Antenna Gain (dBi)                                                                                            | 3.00      |
| EIRP (dBm)                                                                                                    | 18.51     |
| Note: This table listed the worst case power value, please refer to BL-SZ2460359-601 report for more details. |           |

| Mode                                                                                                          | 2.4G WIFI |
|---------------------------------------------------------------------------------------------------------------|-----------|
| Conducted Power (dBm)                                                                                         | 13.15     |
| Antenna Gain (dBi)                                                                                            | 3.00      |
| EIRP (dBm)                                                                                                    | 16.15     |
| Note: This table listed the worst case power value, please refer to BL-SZ2460359-602 report for more details. |           |

## 5.2 Tune-up power

### SGW3531

| Mode      | Conducted Power Range (dBm) | EIRP Range (dBm) | ERP Range (dBm) |
|-----------|-----------------------------|------------------|-----------------|
| Bluetooth | [17.00,19.00]               | [20.00,22.00]    | [17.85,19.85]   |
| 2.4G WIFI | [15.00,17.00]               | [18.00,20.00]    | [15.85,17.85]   |

Note1: ERP= EIRP -2.15dB.  
 Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.

### SGW3101

| Mode      | Conducted Power Range (dBm) | EIRP Range (dBm) | ERP Range (dBm) |
|-----------|-----------------------------|------------------|-----------------|
| Bluetooth | [15.00,17.00]               | [18.00,20.00]    | [15.85,17.85]   |
| 2.4G WIFI | [12.00,14.00]               | [15.00,17.00]    | [12.85,14.85]   |

Note1: ERP= EIRP -2.15dB.  
 Note2: According KDB 447498 D04, used the greater of maximum conducted power and ERP to compare with the threshold value Pth.

### 5.3 RF Exposure Evaluation Result

#### SGW3531

| Evolution mode | Maximum power (dBm) | Maximum power (mw) | Distance (mm) | Threshold Power (mW) | Power / Limit | Verdict |
|----------------|---------------------|--------------------|---------------|----------------------|---------------|---------|
| Bluetooth      | 19.85               | 96.61              | 200           | 3060.00              | 0.032         | Pass    |
| 2.4G WIFI      | 17.85               | 60.95              | 200           | 3060.00              | 0.020         | Pass    |

#### SGW3101

| Evolution mode | Maximum power (dBm) | Maximum power (mw) | Distance (mm) | Threshold Power (mW) | Power / Limit | Verdict |
|----------------|---------------------|--------------------|---------------|----------------------|---------------|---------|
| Bluetooth      | 17.85               | 60.95              | 200           | 3060.00              | 0.020         | Pass    |
| 2.4G WIFI      | 14.85               | 30.55              | 200           | 3060.00              | 0.010         | Pass    |

### 5.4 Conclusion

This EUT is deemed to comply with the reference level limits, therefore the basic restrictions are compliant with human exposure limits.

## Statement

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--END OF REPORT--