



FCC Part 1 Subpart I  
FCC Part 2 Subpart J

**RF EXPOSURE REPORT**

**FOR**

**Bluetooth LE Module (ITM-S-B)**

**MODEL NUMBER : SLP-I211BXOGWW**

**FCC ID: 2AR3A-ITM-S-B**

**REPORT NUMBER: 4788656432-E2V3**

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*Prepared for*  
**SAMSUNG ELECTRONICS CO., LTD.**  
**1 Samsung-ro Giheung-gu Yongin-si Gyeonggi-do, 17113, KOREA**

*Prepared by*  
**UL Korea, Ltd. Suwon Laboratory**  
**218 Maeyeong-ro, Yeongtong-gu,**  
**Suwon-si, Gyeonggi-do, 16675, Korea**  
**TEL: (031) 337-9902**  
**FAX: (031) 213-5433**



**ACCREDITED\***

Testing  
Laboratory

**TL-637**

Revision History

| Rev. | Issue Date | Revisions                       | Revised By  |
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| V1   | 01/02/19   | Initial Issue                   | Hoonpyo Lee |
| V2   | 01/11/19   | Updated about the TCB's request | Hoonpyo Lee |
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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SAMSUNG ELECTRONICS CO., LTD.

**EUT DESCRIPTION:** Bluetooth LE Module

**MODEL NUMBER:** SLP-I211BXOGWW

**EUT WLAN MAC ADDRESS:** R32K500LY6E (RADIATED);  
R32K500M0TM (CONDUCTED)

**DATE TESTED:** OCT 02, 2018 - OCT 05, 2018

| APPLICABLE STANDARDS                    |              |
|-----------------------------------------|--------------|
| STANDARD                                | TEST RESULTS |
| FCC PART 1 SUBPART I & PART 2 SUBPART J | Pass         |

UL Korea, Ltd. caculated the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea, Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea, Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea, Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by IAS, any agency of the Federal Government, or any agency of any government.

Approved & Released For  
UL Korea, Ltd. By:



SungGil Park  
Suwon Lab Engineer  
UL Korea, Ltd.

Tested By:



Hoonpyo Lee  
Suwon Lab Engineer  
UL Korea, Ltd.

## 2. TEST METHODOLOGY

All calculations were made in accordance with FCC KDB 447498 D01 and KDB 447498 D03.

## 3. REFERENCES

All measurements were made as documented in test report UL Korea, Ltd. 4788656432-E1V2 for operation in the 2.4 GHz band (Bluetooth LE).

Output power, Duty cycle and Antenna gain data is excerpted from product documentation provided by the applicant.

## 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea.

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at <http://www.iasonline.org/PDF/TL/TL-637.pdf>.

## 5. MAXIMUM PERMISSIBLE RF EXPOSURE

### 5.1. FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

**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 Exposure</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                        |
| 300-1,500                                                      |                               |                               | f/300                               | 6                        |
| 1,500-100,000                                                  |                               |                               | 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                       |
| 300-1,500                                                      |                               |                               | f/1500                              | 30                       |
| 1,500-100,000                                                  |                               |                               | 1.0                                 | 30                       |

f = frequency in MHz

\* = Plane-wave equivalent power density

#### **Notes:**

- (1) Occupational/controlled exposure limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when a person is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.
- (2) General population/uncontrolled exposure limits apply in situations in which the general public may be exposed, or in which persons who are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure

## 5.2. EQUATIONS

### POWER DENSITY

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * D^2)$$

Where

S = Power density in mW/cm<sup>2</sup>

EIRP = Equivalent Isotropic Radiated Power in mW

D = Separation distance in cm

Power density in units of mW/cm<sup>2</sup> is converted to units of W/m<sup>2</sup> by multiplying by 10.

### DISTANCE

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

Where

D = Separation distance in cm

EIRP = Equivalent Isotropic Radiated Power in mW

S = Power density in mW/cm<sup>2</sup>

### SOURCE-BASED DUTY CYCLE

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

$$\text{Source-based time-averaged EIRP} = (\text{DC} / 100) * \text{EIRP}$$

Where

DC = Duty Cycle in %, as applicable

EIRP = Equivalent Isotropic Radiated Power in W

## 6. RF EXPOSURE RESULTS

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

| Band    | Mode | Separation<br>Distance<br>(cm) | Output<br>AVG<br>Power<br>(dBm) | Antenna<br>Gain<br>(dBi) | Duty<br>Cycle<br>(%) | EIRP<br>(mW) | FCC Power<br>Density<br>(mW/cm <sup>2</sup> ) |
|---------|------|--------------------------------|---------------------------------|--------------------------|----------------------|--------------|-----------------------------------------------|
| 2.4 GHz | BLE  | 20                             | 7.50                            | 3.80                     | 100.0                | 13.5         | 0.003                                         |

### Notes:

- 1) The manufacturer configures output power so that the maximum power, after accounting for manufacturing tolerances, will never exceed the maximum power level measured.
- 2) The output power in the tables above is the maximum power per chain among various channels and various modes within the specific band.
- 3) The antenna gain in the tables above is the maximum antenna gain among various channels within the specified band.

**END OF REPORT**